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# Training for Adaptability and Transfer on Digital Systems

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U.S. Army Research Institute

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Today's soldiers are being trained to use digital systems to enhance duty performance. This research compared training digital skills to entry-level, enlisted soldiers by the conventional method to training by a constructivist method. The constructivist method actively engages soldiers by using realistic vignettes as training tools to acquire and integrate knowledge of the digital system and the military job. After seven days of training, soldiers trained by both methods were asked to complete 1) a practical exercise requiring application of their training in an unfamiliar vignette and 2) the current schoolhouse exam. No difference was found between the conventional training methods and the constructivist method on the current schoolhouse exam. Soldiers trained using the constructivist method were more successful in applying their training to solve unfamiliar problems and reported lower levels of workload. The constructivist training method was shown to improve soldiers' adaptation and application of their training to unfamiliar situations.

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# Training for Adaptability and Transfer on Digital Systems

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# FOREWORD

The young soldiers of tomorrow will be confronted with an array of changing task requirements and evolving digital systems with which to perform them. In such a dynamic environment, soldiers cannot reasonably be trained for each specific task and condition. This dilemma motivated the leadership of the U.S. Army Intelligence Center (USAIC) to ask the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to find a better way to train digital skills. This report presents an approach to training where the soldier becomes a principal training resource. The soldiers' activities are central to training: they search for information, integrate previous learning, and interact with their cohorts to confront and solve new problems.

The Advanced Training Methods Research Unit, as a part of ARI Work Package 209, "Principles and Strategies for Training Digital Skills" worked with USAIC to develop and investigate this training method.

The findings of this research were briefed to the Deputy Commander USAIC and Fort Huachuca, the Distance Learning Office, and course instructors during the summer of 2000. Aspects of this method are being incorporated into courses developed by the Training Development Management Office, 309th Military Intelligence Battalion.

ZITA M. SIMUTIS
Technical Director

# ACKNOWLEDGEMENT

# Training for Adaptability and Transfer on Digital Systems

## EXECUTIVE SUMMARY

**Research Requirement:**

The purpose of this research effort was to determine if a constructivist training method, that integrates operational knowledge and digital system skills, would increase adaptability and transfer for entry-level soldiers.

**Procedure:**

Two groups of Advanced Individual Training (AIT) soldiers, training to become Military Intelligence analysts (96B), were used to compare the effectiveness of the conventional training method and a constructivist training method. The course is 83 training days; training intervention occurred for the seven days (days 66-72) devoted to training the Remote Workstation (RWS), a system that supports graphically depicting the area of interest and communications. The constructivist method featured minimal lecture and integration of the digital equipment training with its application by having soldiers work in small teams on applied military problems with the instructor as a coach. The conventional training method used lectures, demonstration and practice without an applied military context to teach equipment operation. Performance was tested individually on both the schoolhouse exam and an applied practical exercise based on an unfamiliar map location, database, and mission.

**Findings:**

The performance of the soldiers in both training approaches was uniformly high on the schoolhouse exam. The performance of the soldiers taught with the constructivist method was significantly higher ($p < .05$) on the unfamiliar practical exercise; these soldiers also reported significantly lower levels of mental workload ($p < .05$) following the unfamiliar practical exercise than soldiers who had conventional training.

**Utilization of Findings:**

Entry-level soldiers can be trained to be flexible and adaptable in transferring skills to solve unfamiliar practical exercises based on "real world" military situations. In this era of explosive technological change and rapid mission change, soldiers trained to perform in unexpected situations are a force multiplier.

# Training for Adaptability and Transfer on Digital Systems

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# INTRODUCTION

Soldiers joining the Army today are leaders of the future. Training is challenged to develop these young warriors with a conceptual understanding of their role along with a vocabulary that allows them to communicate their proficiencies, successes, and difficulties to their peers and supervisors. These young warriors need to know how to organize their thought processes, set appropriate goals, and become effective problem solvers in a variety of situations. In other words, training is needed that produces flexible and adaptable problem solvers, who function well on teams, know what they know and can find the solutions to what they don't know.

The U.S. Army is committed to leveraging technology to enhance combat power by sharing intelligence, allowing faster decision making, increasing operational tempo, enhancing lethality, improving survivability, and facilitating synchronization. Training soldiers to use these complex and evolving digital systems is fraught with challenges, both a) in the systems themselves, such as dealing with frequent upgrades, system evolutions, and continuing software/hardware problems (Krygiel, 1999) and b) in understanding how to optimize mission success through the use of digital systems. As tasks change and new ones are formed, multiple methods for task accomplishment are necessary and available. This, coupled with increased mission spectrum and tempo, presents a dilemma: In addition to all that soldiers are required to learn, how can they reasonably be trained on all digital tasks with evolving technology, while they train for any and all possible mission conditions? Research shows that combining digital training and real-world complexities has been successful in advancing adaptable thinking at the command level (Ross & Lussier, 1999). Can more realistic training be successful for the entry-level soldier?

This research examined a constructivist training method that advances soldiers' capability to adapt to unexpected task and unpredictable mission conditions in such a way that they reduce workload and function at high levels of competency. The research focused on entry-level Military Intelligence (MI) analysts learning to operate a digital system. Although the data are from MI, the conclusions along with related findings should generalize to other Army tasks.

## Background

U.S. Army training methods focus on delivering a predetermined program of instruction primarily via instructor-led lecture and instructor-assisted practical exercises (PEs). Frequently, these PEs stress isolated aspects of performance without an operational context. For example, entry-level soldiers are taught basic procedures for operating computer-based (i.e., digital) equipment, but instruction frequently is not linked to its operational use. The result is soldiers who understand the "knobology" but not how the digital system functions as a tool to enhance mission accomplishment through increased situational awareness and information transfer. The research reported here implemented and evaluated a constructivist training method that integrated the operational knowledge and digital system skills as a single training event. The rationale was that training which combines knobology with realistic tasks will prepare soldiers

1

better than conventional methods to be adaptable and flexible users of digital systems. Success was determined when soldiers could find solutions for diverse and unfamiliar problems.

Conventional U. S. Army digital training uses a 3-step process: (1) train the military topics or concepts without the use of computer systems (e.g., draw situations by hand on a map), (2) train procedures for digital system operation, and (3) integrate the training content with the digital system (e.g., produce electronic situation maps). Research (Gattiker, 1992) supports the success of acquiring knowledge of the manual task before transferring this knowledge to the digital version.

In contrast, support also is found for an alternative method that emphasizes computers as tools to perform operations (Almog & Hertz-Lazarowitz, 1999) using a constructivist-learning method. The constructivist method builds on existing knowledge by using training experiences embedded in a real-world context (Ross & Yoder, 1999). Learning is interactive with other trainees and the instructor, with the instructor intervening when the trainee is no longer making progress. This intervention or scaffolding takes the form of questioning, demonstrating, discussing, or providing instructions that encourage the trainee to think about the situation more deeply and adaptively. The question remains whether this constructivist method is valuable and would succeed in enhancing the adaptability of enlisted soldiers.

## METHOD

Scientists from ARI compared groups of entry-level, enlisted soldiers on two training methods for digital systems. These were (1) the conventional, lecture-based method, focusing on system operating procedures and (2) a constructivist method using minimal lecture, scenario-based problem solving focused on cooperative learning with the instructor's role as mentor/coach. The primary goal of this second group was to determine if training method influenced a soldier's ability to adapt newly acquired knowledge to unfamiliar mission-related exercises using the digital system. Situational awareness and complex problem solving were emphasized, particularly in scenario-based learning, as essential for system users to determine what cues are relevant, what information is missing, and what responses are justified. Terminal learning objectives (TLOs), established to identify essential course knowledge, remained the same for all groups. All training incorporated PEs to reinforce skills. The research prediction was that the training method would not influence performance on the existing schoolhouse exam, which tested factual material using a familiar map and problems similar to those used throughout the course. Performance was predicted to differ on a PE using an unfamiliar map and problem. The constructivist-trained group was expected to transfer and adapt their knowledge to solve the unfamiliar problem better than the conventionally trained group.

### Participants

Forty-eight enlisted soldiers, most with only basic Army experience, volunteered for this research. These soldiers were receiving their first specialty course, Advanced Individual Training (AIT), toward becoming MI Analysts. Several of the soldiers had prior military experience in

dissimilar occupations such as the motor pool and infantry. Experience in MI was meager and none had used digital equipment to perform the intelligence analyst job. Details about the soldiers/participants are shown in Table 1.

Table 1.

*Demographics*

|  | Mean | Minimum | Maximum | Std. Deviation |
|---|---|---|---|---|
| **Education** | 12.78 years | 12 years | 16 years | 1.31 |
| **Age** | 21.15 years | 18 years | 29 years | 3.07 |
| **Time in Service** | 12.85 months | 6 months | 63 months | 13.94 |

|  | Frequency | | |
|---|---|---|---|
| **Rank** | 40 privates | 6 specialists | 2 sergeants |

Note: Scores from the two sergeants were not used, as they are not entry-level

## Course/Class Description

Traditional AIT for MI analysts requires 83 training days, with the first 65 days devoted to basic skills, including performing analyst tasks using non-digital equipment (e.g., paper maps and acetate overlays). Days 66-72 are dedicated to training on the Remote Workstation (RWS), a digital system used as a communications center for inbound and outbound messages and for creating map overlays of the area of interest (AOI). MI analysts plot information received from other digitized systems and from organic sources (e.g., scouts on the ground) to depict the locations of friendly and non-friendly units and terrain features in the AOI. This accurate and timely picture provides a common view of the AOI for additional analysis and planning. For example, weapon ranges could be estimated and minimal travel time calculated based on terrain features and weapon types.

Three classes, each consisting of 15 or 16 male and female soldiers and a primary instructor, participated in this research only during days 66-72, the time reserved for RWS training. Each of three classrooms contained 15 "plug-and-play" computer systems and one trainer's module that projected the computer display on a large screen in the front of the classroom.

## Description of Training Methods and Implementation

*Conventional method.* Two of the classrooms followed the conventional style of lecture, demonstration, and PE, with the emphasis placed on learning how the system operates (e.g., knobology). The last day of training included an application of the soldiers' knowledge of the system to develop a digital map depicting the battlefield.

*Constructivist method.* One classroom received a brief introduction to the digital equipment and on-line manual followed by presentation of realistic PEs. Implementation of this constructivist training method used a series of short PEs developed by subject matter experts (SMEs) to stress problem solving. The PEs built upon one another and prior learning in the course to accomplish the required tasks. Soldiers worked in teams of 3-to-5 to define the goal of a PE and formulate a plan on how to resolve the problem. When one part of the PE was completed, individual students debriefed the instructor and sometimes other teams then moved forward at their own pace. No training time was added to the program of instruction. The responsibility for learning the material was shifted from being centered on the instructor to being centered on the soldier.

As with traditional training, the role of the instructor remained a critical link in student-centered learning. After basic information was delivered, the instructor circulated throughout the training facility to coach, suggest, and provide insights about how to address difficulties that arose during the PE. The instructor had to be skilled in the use of behaviors that assisted soldiers to learn on their own. For example, when a soldier had difficulty framing a problem regarding the danger posed by the enemy, the instructor coached the student to think through the problem. The instructor said something like: "It sounds to me like you're trying to determine what enemy assets pose the greatest threat to your unit. What are some of the things you look for to determine threats?" This type of coaching helped the student clarify the problem and gather information to solve it. The instructor's role changed from the traditional "sage on stage" to the "guide on the side" (Almog & Hertz-Lazarowitz, 1999). The instructor in the classroom using the constructivist method was provided with 3-hours of training (training materials are in Appendix B) and practiced using these techniques prior to teaching the class. A second instructor, who was to use the constructivist method, was unable to attend this training session. After observing training in this classroom, researchers saw that constructivist methods were not being implemented. Therefore, it was agreed prior to data collection that results would not be included. This emphasizes the importance of preparing trainers to ensure that they understand the underlying principles of the constructivism method.

*Performance Measures.* At the conclusion of the course, each soldier applied course skills to an "experimental" PE about an unfamiliar situation. The learning objectives remained the same but the map and database changed and the problem to be solved centered on battle-damage assessment rather than on defensive tactics. Instructors scored the experimental PE for each of their trainees' accuracy in depiction of the area of interest on the display. Soldiers were told that the PE was to help them prepare for their final examination and would not be used in determining their success in the class. This PE was followed by the schoolhouse final exam.

Background information was collected via a self-report questionnaire that included items on demographics, previous computer experience, and preferred training method. This information was used to identify variables that might influence performance. At the conclusion of the training, soldiers in the constructivist group rated that method as it compared to previous training in the Army. The evaluation instruments are in Appendix A.

An additional measure, the National Aeronautics and Space Administration (NASA)-Task Load Index (TLX), a self-report measure of workload, was administered to all soldiers after the initial PE, at the midpoint of the instructional period, and following the experimental PE just prior to the schoolhouse final exam. Results from the TLX were used to (1) establish the perceived workload involved in training digital skills and (2) note any differences in workload as a function of training method.

## RESULTS and DISCUSSION

### Training Method

Classes using the conventional training method or the constructivist method did not differ on their scores on the schoolhouse final exam. Irrespective of the training method, soldiers mastered the established learning objectives.

The experimental PE evaluated soldiers' ability to be adaptable and apply what they had learned to an unfamiliar problem. Figure 1 shows that the group taught using constructivism performed significantly better on this performance-based PE ($F(1,43)=11.59$, $p<.05$; eta squared = .21). The constructivist training method developed solders that are able to apply their digital training more successfully than soldiers trained using the conventional method.
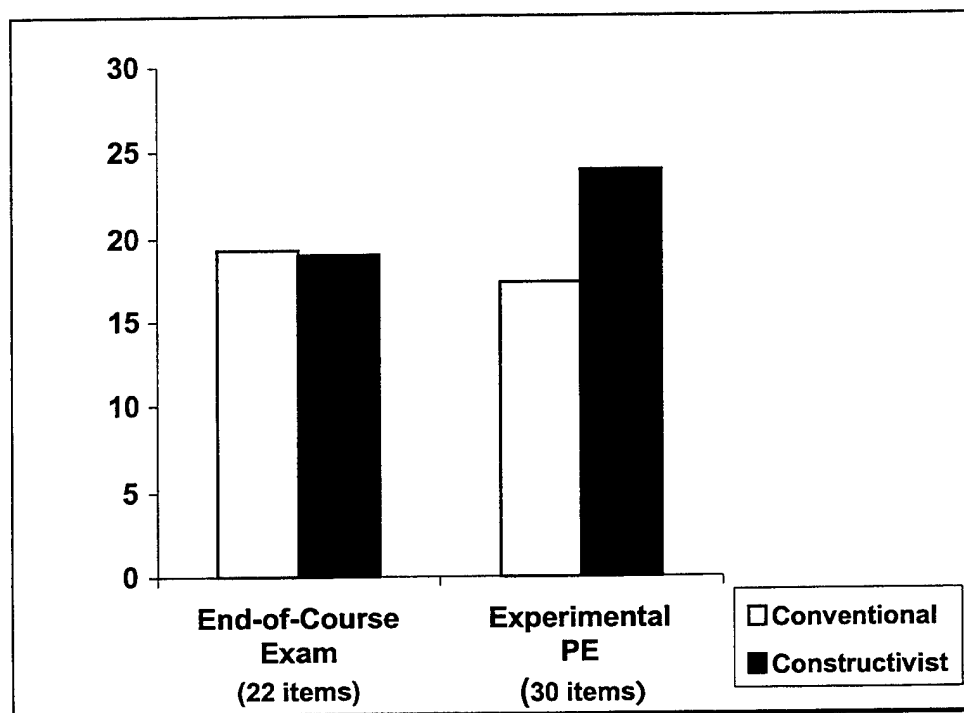


Figure 1. Mean number correct on schoolhouse exam (not significant) and experimental PE as a function of training method.

Constructivist methods present complex and varied problems that make soldiers think more deeply about what they are doing and why they are doing it. Equally responsible for the success of this method is the high level of motivation soldiers demonstrate as they experience tasks relating to Army mission performance. This contrasts with acquiring bits of knowledge out of their real-world context. For example, one of the separate digital TLOs in Intelligence Preparation of the Battlefield is to resize the map screen to three different resolutions. If this is taught as an isolated piece of knowledge (e.g., select XXX from the menu bar, click YYY, choose 1/50000), it may not be correctly applied in actual use or even remembered. On the other hand, "Size the map depicting the battlefield so that it best describes the desired information." requires the soldier to process the information: "What information is needed? What decision will be made using the information? Is the product in sufficient detail to make that decision? Could my commander make a more accurate decision if I used a different scale?"

Trainers using the constructivist method coach by listening, identifying weak links in understanding and asking questions that allow the soldier to clarify goals and improve performance. Trainees explore and discover how to perform with minimal direction. The trainer's role is to probe and question the soldier to prompt more in-depth learning and to ensure that important concepts are acquired. For example, consider that duplicate enemy brigades appear in a vignette requiring soldiers to identify a safe location for joining with another squad. The trainer might say, "I see two enemy armor brigades here. Is it unusual for two armored brigades to be that close together? What do you think is going on?" If the soldiers have not yet questioned the accuracy of the information, the instructor might ask, "What source identified those brigades at that location?"

**Findings from the Student Questionnaire**

There were no significant correlations between demographics (education, age, time in service, rank) and performance on either the schoolhouse exam or the experimental PE.

Questions were asked about previous experience with a computer to determine if that might result in better performance on measures for this digital system. Although no significant relationship was found between previous experience with a computer and performance on either of the evaluation measures, examination of questionnaire results indicates that an overwhelming majority of the soldiers entered the course with computer knowledge. For example, 64 percent owned their own computers and 91 percent described themselves as good with several software packages. Only one soldier reported never using a computer mouse.

No significant correlation was found between performance and preferred method of instruction. That is, soldiers instructed using their preferred method did not perform better, nor did those instructed using their least preferred method perform worse. Table 2 shows the rank order that soldiers gave to different methods for learning a new computer skill. Notice that lecture, the most common method of training, is the least preferred by these soldiers.

Table 2.

*Preferred method of instruction*

| | |
|---|---|
| Learn on own | 56 percent |
| Have someone help me | 56 percent |
| Demonstration | 54 percent |
| Learn with a group | 33 percent |
| Lecture | 13 percent |

Note. Percent of soldiers who selected the method of instruction as their first or second choice.

Entry-level soldiers joining Military Intelligence units today often have some familiarity with computers. Their preferred methods of understanding digital systems are learning on their own and getting help from others; their favored way to learn software packages is by exploring program functions and having someone help them. The constructivist method takes advantage of these preferences as it places more responsibility on the soldier to construct his or her own knowledge through realistic problem solving in collaboration with others. Although soldiers using their preferred method did not outperform those not doing so, leveraging soldiers' preferences may increase motivation, particularly during self-learning.

Soldiers in the constructivist group expressed very positive reactions to the training experience, particularly the self-pacing aspect. Responses on the questionnaire indicated that these soldiers felt challenged and were highly motivated to learn (see Table 3). Teaming with other soldiers to frame and solve problems was seen as especially beneficial to learning. For example, one student stated, "It really helped when I had someone with my mind set teaching me. The instructors sometimes forget we haven't been thinking that much. It made me think harder on what I'm really doing and I see things in a different way."

Army units know that "two heads work better than one." Therefore, working together can help solve problems. However, the more competent the individual soldier, the more she or he contributes to the solution. If you'll pardon another cliché, "you are only as strong as your weakest link." Having to explain and defend a position or action is a powerful learning tool, particularly when acquiring new and complex knowledge. In order to explain an action, a soldier must understand it and put it into language that someone else understands. Peers quickly ask questions when they don't understand and, equally important, point out incorrect assumptions or actions. The constructivist method requires adopting this type of learning, which prepares the soldier to learn how to learn and to transfer training to unit application.

Table 3.
*Soldiers' mean ratings of constructivist method of training*

Compared with my other training in the Army, using the new method is:
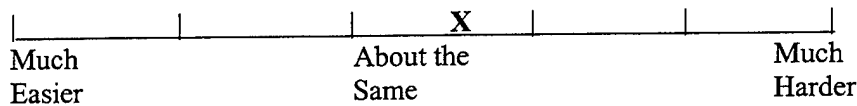
```
|_____|_____|_____X_|_____|_____|
Much                 About the              Much
Easier               Same                   Harder
```

The new teaching method resulted in my learning:

```
|_____|_____X_|_____|_____|_____|
Much                 About the              Much
More                 Same                   Less
```

The new teaching method/materials resulted in my motivation to learn being:

```
|_____|_X_____|_____|_____|_____|
Much                 About the              Much
More                 Same                   Less
```

The collaboration (teaming) between students resulted in my learning:

```
|__X_____|_____|_____|_____|_____|
Much                 About the              Much
More                 Same                   Less
```
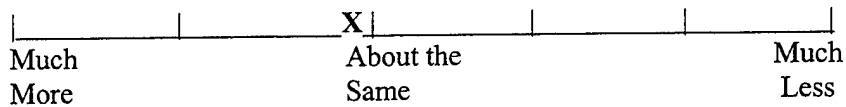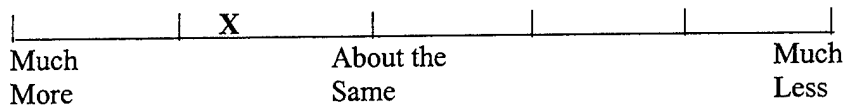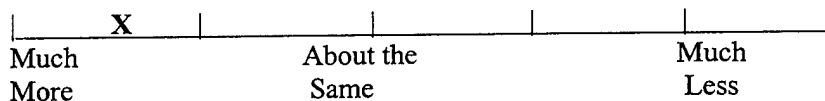
**Workload**

Self-reports of workload after the first PE and at the midpoint of the training indicated no significant differences between the groups trained using the conventional or constructivist method. However, significant differences were found following the final experimental PE that required soldiers to apply their training to an unfamiliar problem. Soldiers trained using the conventional method reported higher levels of mental demand, time stress, and effort than did the constructivist-trained group. Additionally, the group trained under the conventional method rated their performance lower than did the constructivist-trained group (see Figure 2).

Is it possible that participating in "train as you fight" methods encouraged soldiers to deal with problems on their own? Therefore, they were more adept at dealing with the stresses of the experimental PE. Developing an environment that actively engages the learner in acquiring the specified competencies requires careful design of the instructional setting and support materials so that they represent the "real world" while presenting a doable unit of learning. Instructors must resist the temptation to make units too doable and must allow soldiers to deal with errors and the unexpected to promote knowledge retention and knowledge transfer. Soldiers will advance faster if learning begins with elements of the complexity and uncertainty they will encounter in the field.
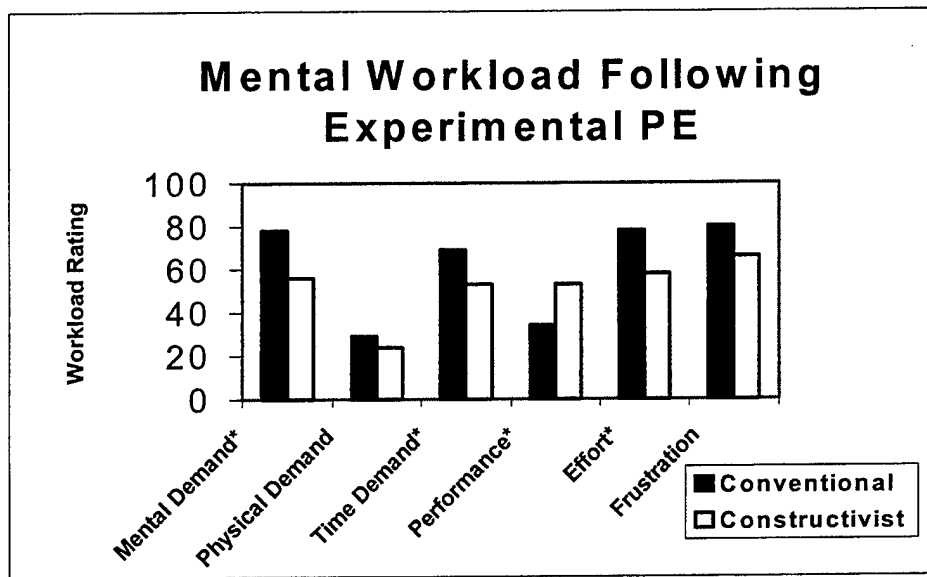
Figure 2. Perceived workload and performance following the experimental PE (*$p$<.05)

Performance on the experimental PE provided insight into how soldiers may perform when they arrive at their unit. The experimental PE changed the map location, database, and mission. Similar changes can be expected in the unit. Table 4 shows the percent of soldiers who reported workload levels of 90 or higher on the 100-point workload scale (0 = lowest workload rating, 100= highest workload rating). TLX results suggested that soldiers taught by the conventional method may experience difficulty applying their knowledge and may require review and additional practice to transfer training from the classroom to the unit. This cautions us that workload should be considered and reviewed early and continuously during the design of a system (Christ, Bulger, Hill, & Zaklad, 1990) to ensure that it is not excessive. MIL-STD-1472C requires that: "Design shall be such that operator workload, accuracy, time constraints, mental processing, and communication requirements do not exceed operator capabilities" (p. 17). The best technology can result in mission failure if it imposes too high a workload on the operator (Chatman & Braddock, 2000).

Table 4.

*Percent of soldiers who experienced high workload (rating >90)*

| TLX Workload | Conventional Method | Constructivist Method |
|---|---|---|
| **Mental Demand** | 45 | 7 |
| **Physical Demand** | 13 | 0 |
| **Time Stress** | 30 | 7 |
| **Performance** | 32 | 0 |
| **Effort** | 39 | 7 |
| **Frustration** | 47 | 21 |

Of particular note is that soldiers trained using the constructivist method covered more material in less time than those taught using the conventional method yet they did not perceive an increase in workload. This was accomplished by developing an environment that actively engages the learner in acquiring the specified competencies.

## CONCLUSIONS AND RECOMMENDATIONS

Results from this research demonstrated a method of training that produces soldiers able to think flexibly and adaptively: ones who transfer and apply learning to unfamiliar situations. Additional benefits include increased motivation, decreased workload, and enhanced collaboration in problem definition and problem solving. Soldiers are taught how to take responsibility for their own learning, a skill necessary in future soldiers if they are to master ever-changing requirements and maintain mission readiness.

Findings from workload assessments suggest that novice operators experience high levels of workload even in a structured learning environment. All soldiers experienced higher levels of workload when asked to apply their learning to an unfamiliar situation, but those taught under the conventional training method reported excessively high levels of mental demand, time pressure, and required effort.

Training practices in the military should change to accommodate the new military doctrine based on smaller, more agile forces, which can dominate the enemy through information superiority. As command organizations are flattened to create connectivity between the commander and the unit, individuals at lower levels will assume higher levels of operational responsibility. Appropriate training techniques must be matched with the material to be mastered and the competencies required. Equally important, trainers, both in the schoolhouse and in the unit, must receive support to understand and implement these changing training methods. Understanding and applying constructivist training methods can enhance the learning process and augment the capabilities of the soldier of the future to successfully solve complex, unfamiliar problems. Defining and implementing the best training practices to develop these future warriors must be a priority.

## Recommendation

- Present complex and varied problems that make soldiers think about what they are doing and why.

- Develop an environment that actively engages the learner in acquiring the specified competencies.

- Plan and execute problem solutions with other soldiers for this is the Army way.

- Coach by listening, identifying weak links in understanding, and asking questions that allow the soldier to clarify goals and improve performance.

- Set group goals and hold individual learners accountable for learning.

- Allow soldiers to move forward when they are ready.

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## Appendix A

Questionnaire to collect demographic information and to rate instructional method
NASA Task Load Index
Digital Task Proficiency
Background Questionnaire
June 2000

Name _____ Last 4 digits of SSN:_____ Age: ____ **M** or **F** *(Circle)*

What is your MOS/skill level? _____ Duty Position _____ Time in Service _____

*For the next three (3) questions, rank order each selection from one to six to show the most preferred (1) to least preferred (6). (USE EACH NUMBER ONLY ONCE.)*

1. During school, which courses did you **enjoy most**? *1 equals most preferred, 6= least preferred*

|  | English | Mathematics | Science | Social Studies | Music/Art | Technology |
|---|---|---|---|---|---|---|
| Rank: | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

2. Which courses did you **do best in?** (Received the highest grades.)

|  | English | Mathematics | Science | Social Studies | Music/Art | Technology |
|---|---|---|---|---|---|---|
| Rank: | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

3. How do you prefer to **learn a new skill**?

|  | Lecture | Demonstration | Learn on own | Learn with a group | Have someone help me. |
|---|---|---|---|---|---|
| Rank: | ( ) | ( ) | ( ) | ( ) | ( ) |

4. When did you use computers? *(Circle all that apply.)*
   Grade School  Middle School  High School  Technical School/College  Army Duty Position

5. For <u>each</u> of the following questions <u>circle the response</u> that best describes you.
   Do you own a personal computer?     Yes     No
   How often do you:
   - Use a mouse?                                    Daily, Weekly, Monthly, Less often, Never
   - Play computer games?                            Daily, Weekly, Monthly, Less often, Never
   - Use icon-based programs/software?               Daily, Weekly, Monthly, Less often, Never
   - Use programs with pull-down menus?              Daily, Weekly, Monthly, Less often, Never
   - Use graphic/drawing features of a package?  Daily, Weekly, Monthly, Less often, Never
   - Use email at home or work?                      Daily, Weekly, Monthly, Less often, Never
   - Use the Internet?                               Daily, Weekly, Monthly, Less often, Never

**(Turn to the Back)**

6. Which of the following best describes your expertise with computers? *(Check one)*

_____ Good with one type of software package (such as word processing, or calendars)
_____ Good with several software packages
_____ Can program in one language and use several software packages
_____ Can program in several languages and use several software packages
_____ Expert-Bill Gates would hire me

7. How do you learn a new software package? (*Check all that apply. Circle the one that you use the most.*)

_____ Read the manual
_____ Play with the program
_____ Watch someone use it
_____ Have someone help me
_____ Take a course
_____ Does not apply to me

# Student Questionnaire

The goal of this study is to determine how changes in instructional approaches influence performance on the RWS. Your responses to this questionnaire are very important in helping us to evaluate the new training. Your responses will remain confidential. Your name will be used to match your responses to your test performance. Then all identifying information will be deleted.

Name _____ Date _____

SSN:_____

- Compared with my other training in the Army, using the new method is:

  |_____|_____|_____|_____|_____|

  Much                             About the                   Much
  Easier                             Same                         Harder

- The new teaching method resulted in my learning:

  |_____|_____|_____|_____|_____|

  Much                             About the                   Much
  More                              Same                        Less

- The new teaching method/materials resulted in my motivation to learn being:

  |_____|_____|_____|_____|_____|

  Much                             About the                   Much
  More                              Same                        Less

- The collaboration (teaming) between students resulted in my learning:

  |_____|_____|_____|_____|_____|

  Much                             About the                   Much
  More                              Same                        Less

The items below were part of the modified instructional technique. Please check all that you feel made the class better. Circle the one that like best.

_____ Realistic settings for the Practical Exercises
_____ Related to and build upon prior knowledge
_____ More "hands on" time during class
_____ Collaborative (team) problem defining
_____ Collaborative problem solving
_____ More responsibility placed on the student for learning
_____ Teacher responding to questions with prompts to find their own solutions

_____

The things that I **liked best** (would definitely keep) about the new approach/materials were:

_____
_____
_____
_____

The things that I **liked least** (would definitely eliminate) about the new approach/materials were:

_____
_____
_____

Thank you very much for your help.

# NASA-Task Load Index

**SSN (last 4 digits):** _____ **Date** _____

**Rate the Exercise just completed.**

**Mental Demand:** How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Low                        High

**Physical Demand:** How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Low                        High

**Time Demand:** How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred: Was the pace slow and leisurely or rapid and frantic?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Low                        High

**Performance:** How successful do you think you were in accomplishing the goals of the tasks? How satisfied were you with your performance in accomplishing these goals?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Good                       Poor

**Effort:** How hard did you have to work (mentally and physically) to accomplish your level of performance?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Low                        High

**Frustration:** How insecure, discouraged, irritated, and annoyed versus secure, gratified, content, and complacent did you feel during the task?

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Low                        High

# Appendix B

## Instructor's Training Guide

# Leader's Guide
# to
# Exploratory/Discovery
# Learning
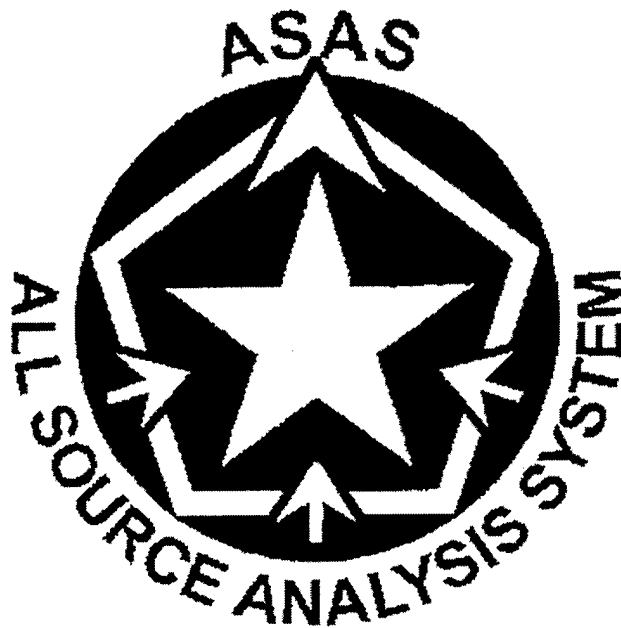
# Introduction

The U. S. Army Intelligence Center and School at Fort Huachuca with assistance from the U.S. Army Research Institute are investigating innovate training methods that hold promise of enhancing junior-level soldiers' training in digital skills. The goals of these methods are to produce multi-skilled, adaptable, and digitally proficient soldiers.

Research has found that these methods:

- Enhance the role of the instructor as a SME to coach/shape performance.

- Strengthen the connection between training and its application in the unit.

- Increase adaptability in transferring training to new situations.

- Improve motivation by placing training in a real-world context.

- Develop team collaboration in problem definition and problem solving.

- Supports an adult learning model that places responsibility for learning on the student and encourages self-learning.
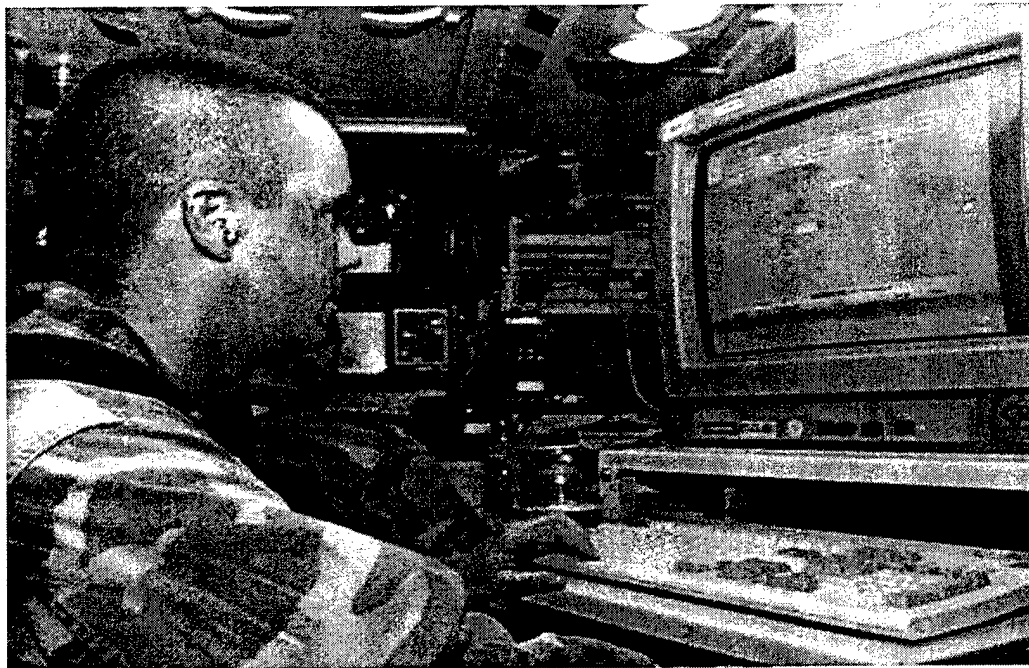
## Research Findings for RWS

### Test for Flexibility
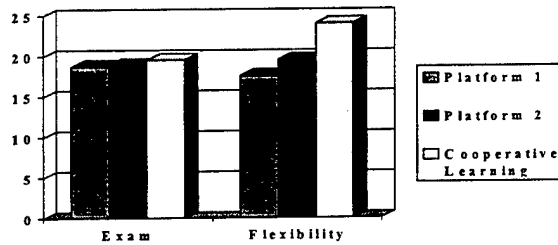


**Student Questionnaire**

- Compared with my other training in the Army, using the new method is:
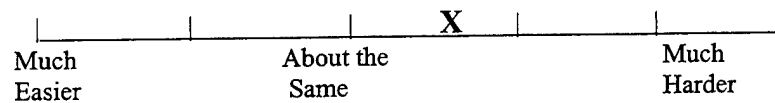
|_____|_____|_____**X**____|_____|_____|

Much       About the       Much
Easier       Same        Harder

- The new teaching method resulted in my learning:

|_____|_____**X**_____|_____|_____|

Much       About the       Much
More       Same        Less

- The new teaching method/materials resulted in my motivation to learn being:

|_____|**X**_____|_____|_____|_____|

Much       About the       Much
More       Same        Less

- The collaboration (teaming) between students resulted in my learning:

|____**X**_____|_____|_____|_____|_____|

Much       About the       Much
More       Same        Less
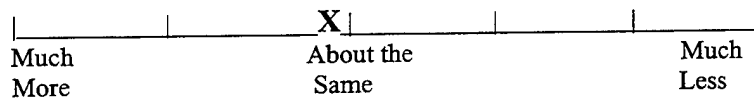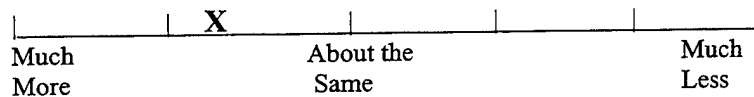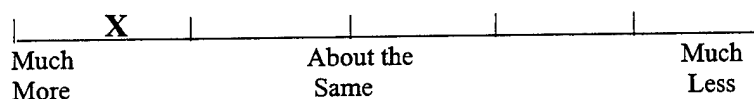
**Liked Best:**
Students helping each other.
I like being able to work on my own and ahead. Working with others is great also.
I like the chairs.
The team work! It really helped when I had someone with my mind set teaching me. The instructors sometimes forget we haven't been thinking that much.
Group learning, learning at own pace.
More hands on, working with others. The interaction between students.
More time to work on our own.

**This guide provides:**

1. Descriptions of the discovery/exploratory training method.
   - Instructor scaffolding of new information and continued learning
   - Team collaboration
   - Real-world context

2. Descriptions and examples of coaching methods that promote in-depth understanding of digital systems (i.e., crew drill).

3. Descriptions of how to provide the novice with a solid base with which to advance towards higher levels of performance.
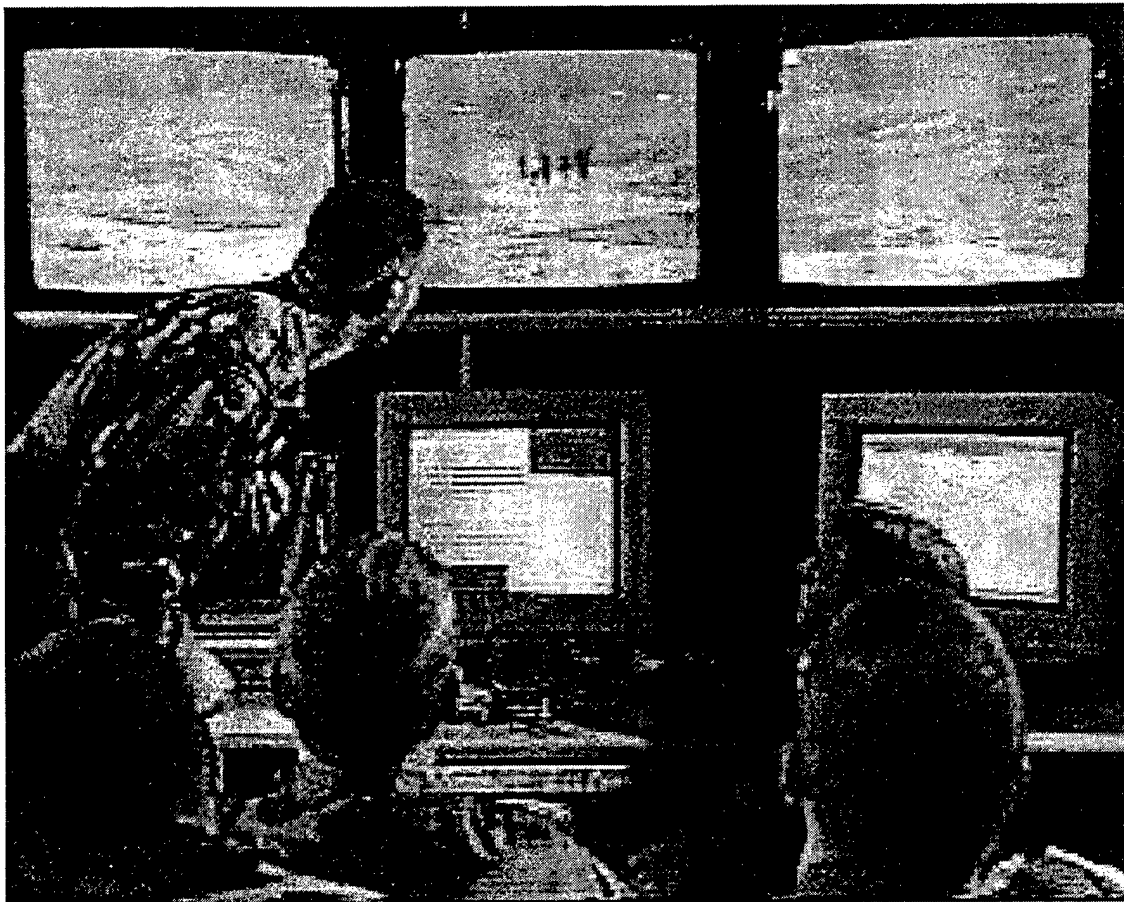
**Who was your trainer? Describe the characteristics of this trainer.**




**Describe the environment of the learning? How did it contribute to the learning experience?**




**How did the learning take place?**




**Why was this a successful learning experience?**

## What do I know and how did I learn it?

The _BEST_ learning experience
that I ever had was:

_____

_____

What is your most successful
experience as an instructor?

_____

_____

_____

_____

Answer each of the following on
the opposite page.

1. Who was your "trainer" in
   this learning experience?
   Provide a descriptor, not a
   name (e.g., parent, friend,
   coach, general).

The _WORST_ learning experience
that I ever had was:

_____

_____

_____

_____

2. What was the setting or
   environment where the
   learning occurred?

3. How did the learning take
   place?

What made this experience fail?
How could it have been
improved?

4. Why was this such a good
   learning experience? What
   made it significant for you?

What similarities are there between your best learning experience and
your most successful teaching experience?

Get together as a group and develop a definition that characterizes a
great learning experience.

# The U.S. Army is Changing the Way It does Business
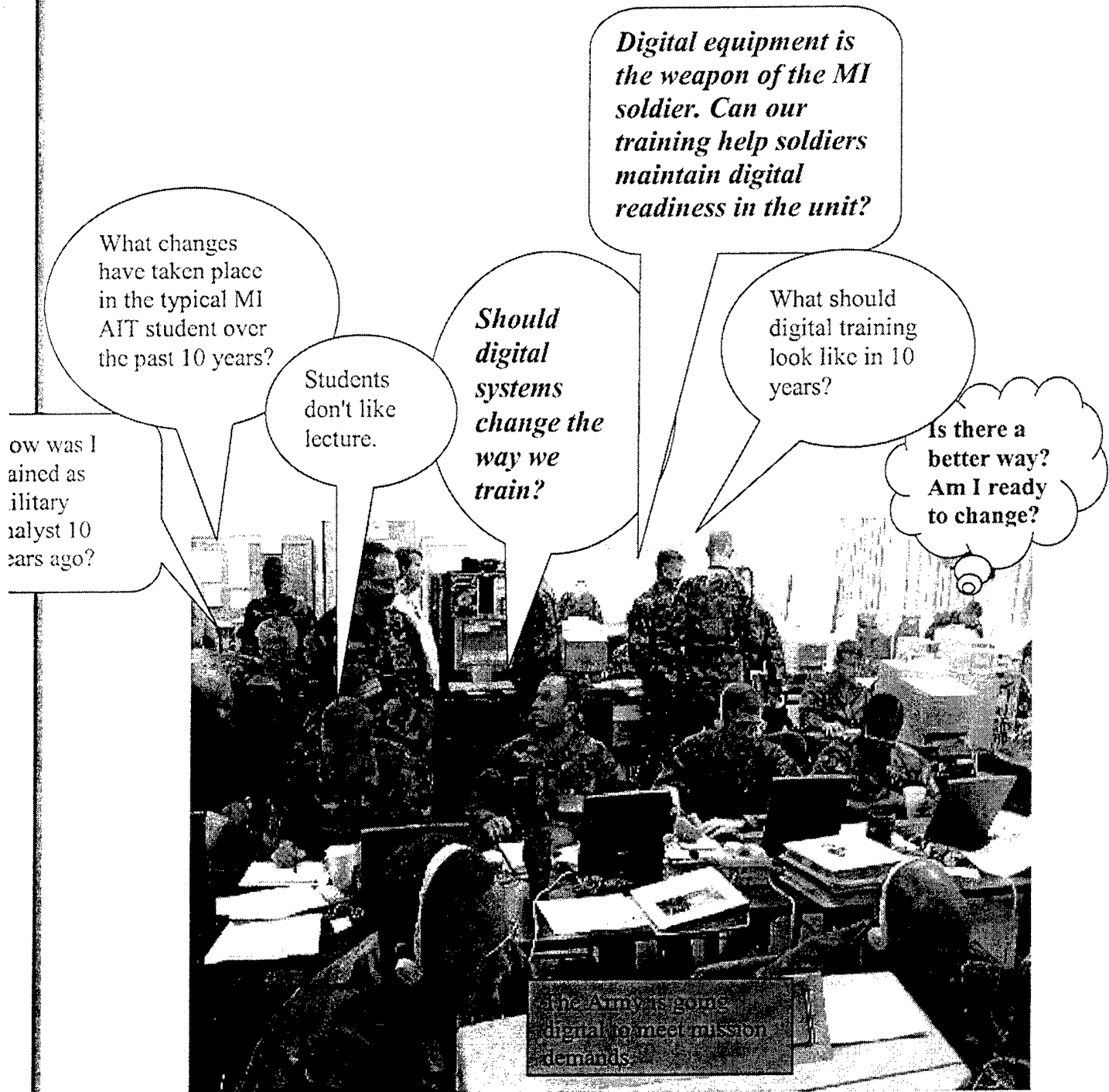


## What is Discovery/Exploratory Training?

**Directions:** The activities on this page provide a sample lesson using the discovery method. Take 10 minutes to complete these activities. When you are finished, use the After Action Review method to discuss some lessons learned that you can apply to your training.

Problem: Your teenager has reached the legal age to obtain a driver's permit. The driver's education class is full and you decide to teach your teenager to drive.

1. What are the competencies that you will focus on to ensure that your teenager becomes a competent driver? List them on the next page. (*Perform individually*)

2. You discover that your co-worker is about to begin driver's training with her teenager. Get together with this co-worker. Are your goals similar? Were there some competencies that you didn't consider but should have? As you discuss your lists, list any new competencies that come to mind? *(Work with a group)*

3. Prioritize the competencies into a single list in the space provided below. Determine which competencies you will focus on first. What types of patterns emerge? What are the main themes or ideas? Did you provide information to explain or support your choices? Are some competencies best taught together?

**After Action Review: What are some training lessons/techniques that you used n this activity that can be applied in teaching your course?**

**Problem: You have been selected to teach the ASAS/RWS course to an elite group of U.S. Army soldiers. These soldiers need excellent instruction because they will be training others.**

1. **What competencies will you focus on to ensure that soldiers become competent analysts? List them on the next page. (*Perform individually.*)**

2. **Your are preparing to train 96B10-30 level soldiers to work in a brigade S2 shop. Get together with your co-instructors and discuss your lists of core competencies. (*Consider how these soldiers will use the RWS in their unit? What tactical situations will they face?*)**

3. **Prioritize your competencies into a single list and determine which competencies you will focus on first. Justify your decision and come to a group decision on where you want to focus your time.**

4. **What are some training techniques that will ensure that soldiers leave the course with these competencies? (*Remember your best learning experience.*)**

**After Action Review: What are some training lessons/techniques that you used in this activity that can be applied in teaching your course?**

# What Did You Learn from the AAR?

Some important components of the discovery/exploratory method are listed below. How many did you "discover" in your AAR?  How much of this information is new?

## Team Problem Definition and Problem Solving is the Army Way

- Analysis requires exchanging ideas, justifications, and speculations to support or disconfirm conclusions. Considering different perspectives.
- Training develops the ability to understand, explain, and defend knowledge to clarify, elaborate, and evaluate understanding

## Prior Experience Influences Current Learning

How can we prepare the novice so that she/he has the prerequisite competencies to become an expert? The way we learn influences future performance.



> The elevation lines are close. this is a steep gradient.

> If I concentrate I can mentally construct a good picture of this terrain.

> The enemy will view this as restrictive, thus avoid it and go to the right or left.

> Let me remember. what does that symbol mean?

> I can use this terrain to kill him when he exposes his flank.

Past experience influences current learning.

## Real-world Context Improves Learning (*Train as you fight.*)

- Enhances transfer to other applications
- Motivates to stay on task longer
- Moves the novice forward faster

## Examples of Responses that Promote Thinking

*It is easy to give a solution or answer to trainees, but this can prevent them from getting the experience that they need to learn how to solve problems on their own. Below are samples of responses to students' performance that encourage students use of the exploratory/discovery method.*

<u>Frames a problem or states a goal</u>:

- It sounds to me like you are trying to determine what enemy assets pose the greatest threat.

<u>Encourage attention to conflicts and differences in opinions</u>:

- You think that the best COA is to engage the enemy at point X, while group B wants to engage at point Y. Get with Group B. Discuss which is the best COA.

<u>Refocuses the task</u>:

- So far you have located all of the brigades. How would you locate only the 4th Brigade?

<u>Invites interaction of ideas</u>:

- What is Private James asking? Who can expand on that?

<u>Prompts clarification</u>:

- When you say enlarge the map, what exactly are you referring to? How would you do that?

<u>Turns question back to its owner</u>:

- What do you think?

<u>Communicates standards for explanations</u>:

- What evidence can you provide to back your claim that the enemy battalion cannot see your unit?

<u>Asks for elaboration/clarification</u>:

- Tell us about the angle of fire that you mentioned.
- Tell me what you mean when you say that the enemy can't come over Route 76?

<u>Restate or summarize student statements</u>:

- You're saying that the tanks cannot come down Route 76 because they are too heavy?

## Practice using Statements that Prompt Thinking

**(*This is the hardest part!*)**

The previous page showed some examples of mentoring to help students discover solutions. The underlined statements on this page identify important roles that the instructor performs. The bulleted items suggest ways to prompt the student to encourage learning.  Look at Map PE 1. Think of activities that a student might perform that would benefit from instructor intervention. <u>Write a response that would coach the student to reach their goal on the lines provided.</u>  The first item is completed as an example.

Observe for mistaken assumptions

- **Refocus the task**
- **Prompt clarification**
- **Ask for elaboration/clarification**

*Example: Why did you select that fill pattern? Show me how you did it? Did anybody else do it differently? Private Jones, how does your pattern differ from Private Smith's?*

_____

_____

Support problem structuring

- **Frame a problem or state a goal**
- **Encourage attention to conflicts and differences in opinions**

_____

_____

_____

- **Invite interaction of ideas**
- **Ask for elaboration/clarification**

_____

_____

_____

Introduce overlooked data, perspectives, or connections
- Encourage attention to conflicts and differences in opinions

_____

_____

_____

- **Turn question back to its owner**
- **Ask for elaboration/clarification**

_____

_____

**Highlight issues**

- **Invite interaction of ideas**
- **Prompt clarification**

_____

_____

_____

- **Turn question back to its owner**
- **Restate or summarize student statements**

_____

_____

_____

**Demonstrate expert performance**

- **Invite interaction of ideas**
- **Communicate standards for explanations**

_____

_____

_____

_____

## Characteristics of a Great Mentor

Group Discussion: Let's return to our ASAS/RWS example. You have defined the competencies that you want your soldier to have and developed a plan on how to proceed. What would your training look like?

- What resources do you need to proceed?

- How should the competencies be sequenced? Are there prerequisites? Are there skills that should be taught early so that they can be practiced often?

- How can I maximize "hands on" practice with soldiers working on different levels? Why/when would you use different approaches?

- How would you determine if your soldiers have mastered a skill or process and are ready to move on?

- How would you correct errors in training? (Do you know people who have held an MOS for years, yet are not proficient soldiers?) Identifying errors (performance feedback) is not enough. Learners need to practice correct behaviors.

Asking questions similar to those above is the trademark of a good coach or mentor.

# Behaviors seen in a Great Trainer

- Provide the opportunity to solve "real" problems (*How does the terrain limit our options?*)

- Model expert performance, while guiding the student through careful monitoring and questioning.

- Prompt soldiers to analyze problems and identify contingencies/actions (*What would you do if you lost your EDC?*)

- Provide a safe learning environment where students can explore and make mistakes. This requires careful monitoring of performance and redirect efforts when the student gets too far off course.

- Trainers must be confident enough in their own skills to encourage exchanges information/ideas with the soldier, consider the merits of soldiers solutions, recognize novel approaches, and consider new ideas.
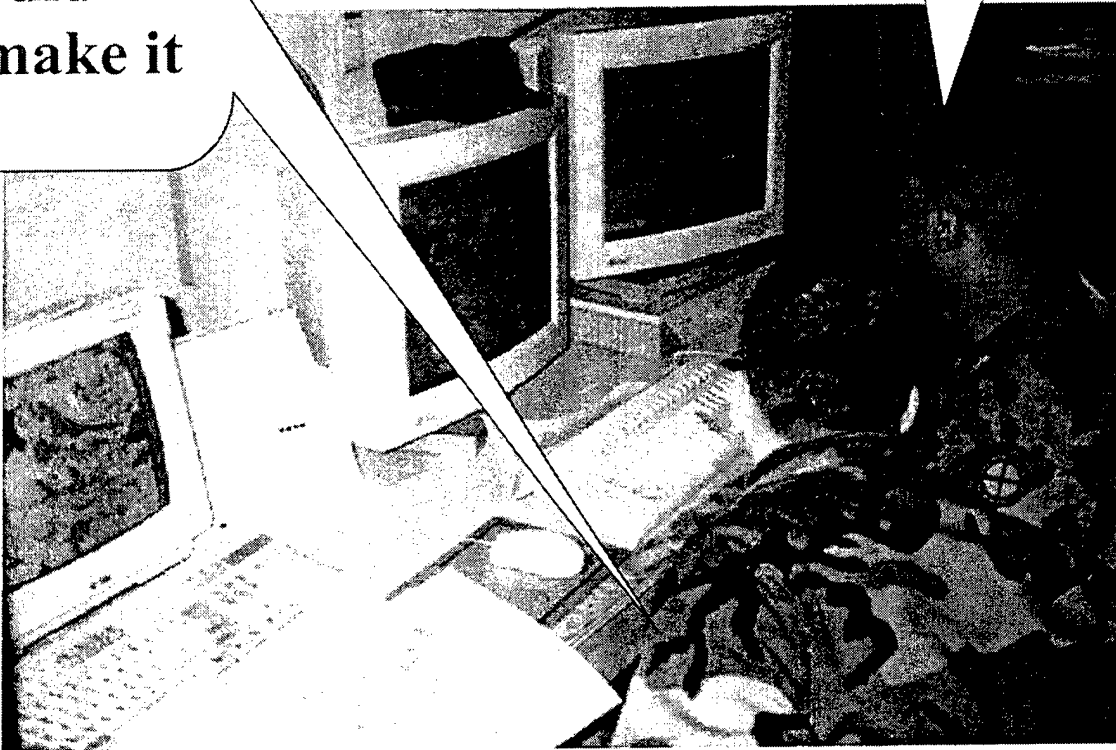
# Your Mission

The ASAS/RWS may be monitored 24-h a day. Who you gonna call with a problem? If you're the most proficient, you're it. With this in mind, be sure that all team members have the knowledge and skills to do the job.

- Understand the Goal and the Issues

  - Focus on the team's purpose
  - Discuss what you know (IPB, MI objectives, map skills)
  - Analyze different points of view
  - Speak out if you think that the team is going in the wrong direction
  - Define the process to solve the problem

- Gather Basic Information and Solve the Problem

  - Speak up when you have ideas to share
  - Listen to others and build on their ideas
  - Check other sources of information
  - Give reasons for your opinions, clarify your response
  - Check the group for agreement or conflicting ideas
  - Ask people to explain if you don't understand

- Evaluate Your Group's Product

  - Describe how you solved the problem.

  - What are your conclusions/recommendations?

  - Did your product achieve the goal?

  - How many different solutions can you identify? Explain why?

  - How could your product be improved upon?

# *Where in the world is the U.S. Army?*
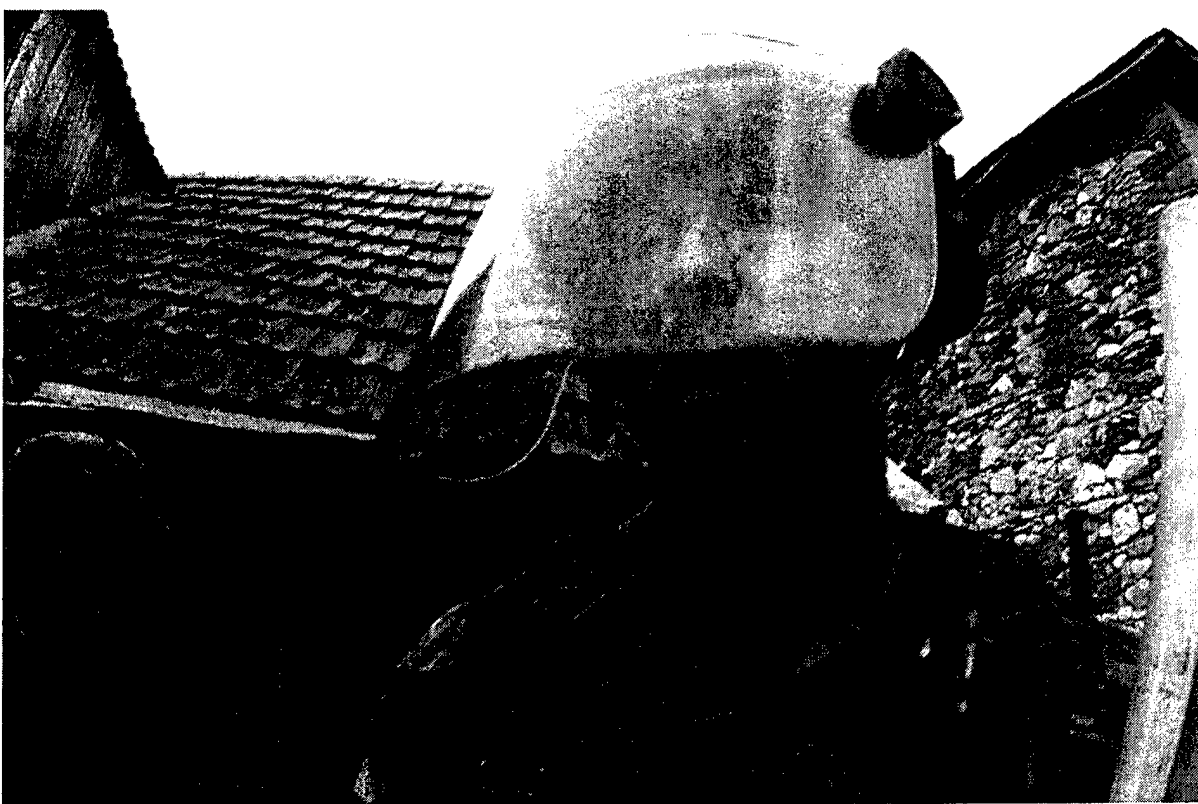
### ASAS-RWS MAP PE #1 (Map Operations)

The ASAS-RWS has a limited capability to develop and store analytic aids for future reference and comparison. You have had some practice in employing the draw pallet. This exercise will permit you to use the tools of ASAS-RWS to examine and highlight the military aspects of terrain for a defined geographic area and create a MCOO.

During this exercise you will continue to perform as an Analyst in the G2 Operations Section of the 2nd Infantry Division. You are tasked to support the G2 and G3 Plans Sections. They are developing contingency plans. Normally, an area of interest (AI) or area of operations (AO) focuses IPB. Unit boundaries and the mission define these areas. This planning effort is focused on a defined geographic area. The AI box remains defined by the latitude and longitude points of: 37°53'00"N 127°00'00"E to 37°53'00"N 127°07'00"E to 37°45'30"N 127°07'00"E to 37°45'30"N 127°00'00"E. Using the G2 SOP extract as a guide for guide for form and standardization and the graphic capabilities of your ASAS-RWS develop a 1:50,000 scale modified combined obstacles overlay of this potential battle space.

### REQUIREMENTS

(**NOTE**: Take a few minutes with questions below to orient on and explore the ASAS-RWS basic map and graphics capabilities. You will use a map from the Division's current area of operation; load the NKO 3739 map and enlarge the map to full screen.)

1. What scales of maps are available?

2. Can you alter the system view without changing scale?

3. Of the map scales available, which scales will normally be used by the division during operations and planning?

4. Which scales would be used by a Corps?                    Why?

5. Which scales would be used by maneuver brigades?          Why?

6. What graphic shapes can you create?

7. How do these shapes relate to standard military symbols and the symbols that you will use for IPB and analysis?

8. Can you clear objects, as well as, place objects on the map?

9. What capability do you have to change size, orientation, and color of the objects and shapes that you create?

10. How do these colors relate to standard military maps?

How do these colors relate to doctrinal requirements for graphic overlays and symbols?

11. Intelligence production staffs and units generally establish standard operating procedures (SOP) that contain standards for graphic products. An extract of your G2 SOP has been provided. How do these colors relate to the G2 SOP extract for graphic products?

Are other colors available?

If available, why, how could other colors be used?

How are restricted terrain and built up areas to be identified by SOP?

12. Do other capabilities to enhance graphics or assist your efforts to visually emphasize aspects of terrain, the enemy situation, or specific characteristics of the battlefield?

You are quickly becoming an expert.

Execute the requirement to develop the MCOO of the identified AI. Present a prebrief of your demonstration to your NCOIC (instructor). Save your final product as an overlay.
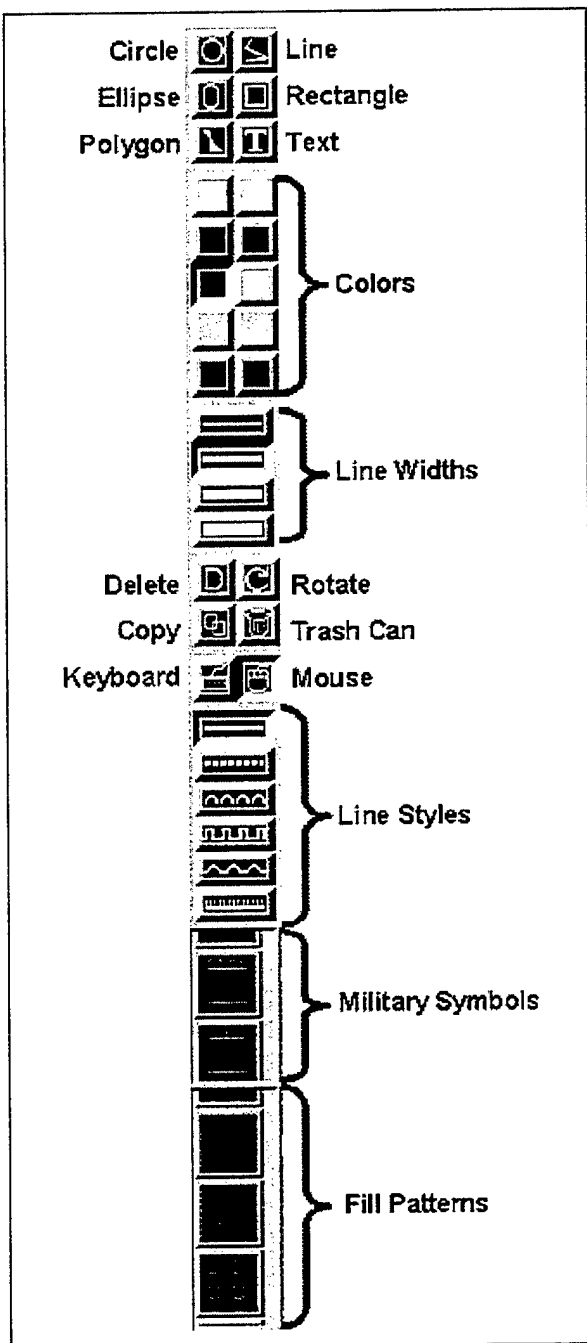
The draw palette permits you to select a variety of line styles and shapes. You can vary thickness, orientation, and color for all graphics. From the palette select the line styles or symbols that correspond to the military symbols and depict the following in your AI:

A. Unit boundary / Phaseline

B. Proposed control measure

C. Phaseline

D. Prepared defensive or fortified position

E. Obstacle (How should the symbol be labeled to determine if it was emplaced by friendly or enemy forces? Are mine, wire, and concertina obstacles depicted in the same manner?)

F. Strong point

G. Front line trace or line of contact (Since opposing forces are not always in direct contact, how should these opposing lines be depicted?)

H. A no fire area

Show your work to your instructor, then clear your map.

Develop, **on paper**, a doctrinal template for an OPFOR Motorized Rifle Division. Use the organization indicated below. Assume a division main attack with two regiments in the 1$^{st}$ echelon. Include graphics and measurements that would assist in the use of this doctrinal template.

**Example Motorized Rifle Division Force Structure:**
Two (2) BTR-80 equipped motorized rifle regiments
One (1) BMP-2 equipped motorized rifle regiment
One (1) T-72 equipped tank regiment
One (1) Artillery Regiment (Keep in mind that additional artillery will be allocated to this attack. Consider the location of RAGs and DAGs)

Brief your section NCOIC (Instructor) on your product and retain the final approved graphic for future reference.

**NOTE:** Examples of some doctrinal templates, not drawn to scale, are provided for your reference.

Keep in mind that doctrinal or reference templates can take many forms. Some are graphic, like the one you will create. Some are timetables, for example the firing sequence and signatures for a SCUD B missile launch. In SASO operations, hostile actions such as the mode of operations for a bank robbery, templates could have both graphic and time related elements.

The template capability of Block I ASAS-RWS is somewhat restrictive so we will not require you to enter this data. Be prepared to use your manual template with digital products that you will develop later.

# G2 Operations Standing Operations Procedure (SOP) Extract: MCOO

NOTE: The **MODIFIED COMBINED OBSTACLES OVERLAY** (MCOO) is a product used to depict the battlefield's effects on military operations. It is normally based on map products, terrain studies, or imagery that depict all obstacles to mobility. This extract will provide the techniques and procedures that could be used in an intelligence staff organization to assure the standardization and quality of products.

1. Place registration marks in both the upper right and lower left, or the lower right and upper left corners of the overlay or template.

2. Post the overall classification at the top and bottom center of the overlay, normally in large black letters. Generally, the MCOO will not be classified higher than SECRET and is never classified higher than the OPORD or contingency plan it supports.

3. Develop a legend. The legend is normally placed in a separate corner of the overlay. The legend contains a description of all symbols used on the MCOO.

4. Title the overlay. The title is used to identify the individuals or headquarters preparing the overlay and is normally placed in the lower right corner of the overlay or template, and contains:
   a. Map sheet name(s).
   b. Map sheet number(s).
   c. Map series(s).
   d. Map scale(s).
   e. Prepared by line.

5. Identify severely restricted terrain using GREEN or BROWN crosshatching on the overlay. This does not imply that movement through that area is impossible, only that it is impractical. Example of severely restricted terrain are minefields, unfordable rivers that exceed vehicle-launched bridge length, and road or railroad embankments. Terrain is considered severely restricted when it--
   a. Will not support maneuver by the type of forces involved.
   b. Will support maneuver only through the employment of highly unusual assets, or through a deviation from doctrine.

6. Identify restricted terrain on the overlay by outlining the area in GREEN or BROWN diagonal lines. Restricted terrain for armored or mechanized forces typically consists of moderate to steep slopes or moderate to densely spaced obstacles such as trees, rocks, or buildings. Swamps or rugged terrain are examples of restricted terrain for dismounted infantry forces. Terrain is considered restricted when--
   a. Units have difficulty maintaining preferred speeds, moving in combat formations, or transitioning from one formation to another.
   b. Terrain slows movement by requiring zigzagging or frequent detours.

7. Identify built-up areas larger than 1 square kilometer by BLACK crosshatch lines.

8. Outline river and water obstacles such as swamps, lakes, ponds, and canals in BLUE.

9. Designate key terrain by a circle with a "K" inside. PURPLE is recommended for showing key terrain, as the color stands out from the other colors normally used on the MCOO. Examples are--
   a. A specific segment of high ground.
   b. Sections of major highways or intersections.
   c. Bridges.

d. Communications centers.
e. Sections of railroads or railroad junctions and intersections.
f. Airfields.
g. Industrial facilities.

10. Depict defensible terrain by outlining an oval circle around terrain that offers some concealment and cover to defending forces while also providing observation and fields of fire into potential engagement areas. Ideal defensible terrain is difficult to bypass, offers concealed and covered battle positions, covered withdrawal routes, and overlooks engagement areas that allow the defending force to use all of their weapon systems at their maximum ranges.

11. Depict engagement area by a target reference point in the center of the trap area or by prominent terrain features around the area. Engagement area is an area in which the commander intends to trap and destroy an enemy force with the massed fires of available weapons.

12. Depict counter-mobility obstacle systems (antitank ditch, minefields) in GREEN. These are obstacles planned for future emplacement by friendly units or those suspected within threat positions.

13. Depict obstacles such as roads and rail cuts, embankments, power lines, and overpasses in BLACK using the symbols found in FM 101-5-1.

14. Depict threat ground avenues of approach by drawing an arrow towards a likely objective. Each AA will be prioritized with the letters "AA" and a number. The number will indicate which AA is the best, and will be drawn in RED.

15. Depict threat mobility corridors (MCs) in RED. MCs are areas where a force will be canalized due to terrain restrictions. They allow military forces to capitalize on the principles of mass and speed and are therefore free of obstacles. MCs are prioritized with the letters "MC" followed by a letter.

16. Depict air avenue-of approach (AAA) by drawing an arrow toward the objective. The tails of the arrow will cross approximately in the middle. Each AAA will be prioritized with the letters "AAA" and the number of the AAA will correspond with the ground avenue it is supporting.

# DOCTRINAL TEMPLATES

During the IPB process analysts produce four templates – doctrinal, situational, event, and decision support. These templates help the analyst to deduce and analyze enemy capabilities, predict their most likely courses of action, identify information gaps, and predetermine locations, events, or critical elements for collection and targeting.

Doctrinal templates are depictions of an enemy force deployed for various types of operations without the constraints imposed by the weather and terrain. Information for the development of doctrinal templates comes from the study of a particular force and includes:
> 1. Tactics taught and practiced.
> 2. Observations and intelligence collected from training maneuvers and combat.
> 3. Writings of military leaders, historical documents, and instructional texts such as field manuals.

Composition of the force, formations, allocation of areas of operation or battle space, and frontages and depths of a force are considered. Additionally, weapons systems, unit equipment numbers, and force allocation methods such as norms or desired force ratios are considered.

Before creating or selecting a doctrinal template, the analyst should determine which enemy force or echelon of the force is the focal point for analysis. In conventional force operations, the commander is normally focused on one echelon above his own and includes depictions of enemy maneuver elements two echelons below that of the US force conducting the analysis. An operations or unit matrix may assist in determining units, formations, battlefield functional systems, and operations to be templated.

The attached diagrams provide a depiction of an armored- and mechanized-based opposing force (OPFOR) planning guides and tactical formations. The OPFOR depicted will attempt to generate favorable force ratios at critical points on the battlefield of not less than 3:1 in tanks, 6:1 artillery, and 4:1 in infantry to assure success of an attack.

Though our example uses heavy conventional OPFOR, doctrinal templates may be developed for SASO operations. Modes of operation for hostage seizures, bank robberies, and convoy ambushes lend themselves to template development and may be used to support analysis, planning, and decision making.

### ASAS-RWS MAP PE #2 (Map Operations)

The ASAS-RWS permits you to combine and compare stored graphics to assist in analysis and the production of intelligence. You have already developed and stored a MCOO for a specified AI. Additionally, you have a doctrinal attack template. Both of these products could have a number of applications during the Military Decision-Making Process (MDMP).

Your requirement will be the development of a situation template to depict a probable enemy course of action. Once completed you will explore additional applications of these products for targeting and collection management.

You will continue as an Analyst in the G2 Operations Section of the 2nd Infantry Division. Support to the G2 and G3 Plans Sections remains your primary mission. Their planning effort remains focused on a defined geographic area. The AI box is defined by the latitude and longitude points of: 37°53'00"N 127°00'00"E to 37°53'00"N 127°07'00"E to 37°45'30"N 127°07'00"E to 37°45'30"N 127°00'00"E.

### REQUIREMENTS

Using the doctrinal template and the MCOO develop in the previous requirements construct a situational template of an OPFOR Motorized Rifle Division attacking. This is the product that the Planners need for their consideration. Assume a friendly defense North of Eujongbu anchored by strong point astride Highway 3 positioned one (1) kilometer North of the city. The enemy course of action that your situational template will depict is a main attack South by the 111th Motorized Rifle Division with 2 motorized regiments abreast. Depict this division deployed in the avenues of approach through the valleys to the Northeast and North of Eujongbu.

The order of battle for the 111th MRD is:

        11th MRR/111th MRD (BTR 60)
        12th MRR/111th MRD (BTR 60)
        167th MRR/ 111th MRD (BMP)
        13th TR/111th MRD (T-72)
        111th Arty Regt/ 111th MRD (SP)

After you complete the situation template answer the following questions.

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1. Are there different ways to plot and construct these symbols and units? _____

2. Does your situation template look exactly like your neighbors? _____ Whose situation overlay is correct?

_____

_____

3. A graphic situation template is a "snapshot" in time. It is important to convey that to the user (commander, planner, operator, and/ or targeteer) who will make assumptions or take actions based on the graphic. Define your "snapshot-in-time".

_____

_____

_____

4. Can you predict probable deployment lines? (Do not forget about the influences of terrain.) Can you predict probable locations for RAG and DAG firing positions? (Keep in mind mobility and "flight path"/ trajectory requirements.)

_____

_____

5. Without a detailed order of battle, identify units, items or types of equipment that would be critical to the OPFOR's attack.

Make a list of these potential high value targets (HVTs).

_____

_____

_____

Select 3 items or units from your HVT list. Thinking as the enemy commander, select locations for these items or units within or to support the attacking maneuver forces.

_____

_____

List 2 visual or electronic signatures for each item or unit. What divisional collection means **could** acquire these signatures?

_____

6. At what points would the maneuver of these formations be restricted or slowed? Create a separate overlay and identify these potential named areas of interest (NAIs) and target areas of interest (TAIs)?

_____

_____

Present a prebrief of your products to your NCOIC. Save your approved overlays for future use.

C-15

Clear the map, and close all applications.

## TACTICAL OBJECTIVES



**ENEMY FEBA**

20 - 30 km    8 - 15 km    2 - 4 km

BATTALION SUBSEQUENT
OBJECTIVES

REGIMENTAL AXIS

DIVISION
IMMEDIATE
OBJECTIVE

REGIMENT
SUBSEQUENT
OBJECTIVE

REGIMENT
IMMEDIATE
OBJECTIVE

BATTALION
IMMEDIATE
OBJECTIVES
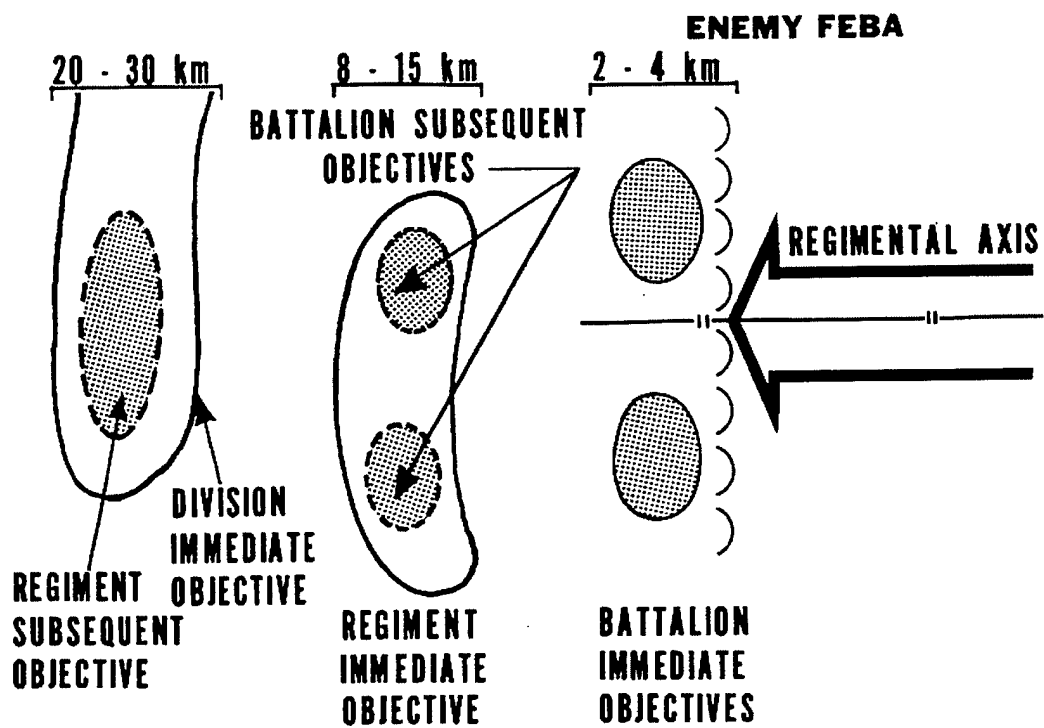
# BMP BATTALION ATTACKING IN TWO ECHELONS



MRC CDR

120MM MORTAR BTRY

MORTAR BTRY SPT

2D ECHELON

TK CO CDR

MRB CDR

ARTY BTRY CDR

ARTY

AMMO/ZSU 23-4

MRC CDR

1—1.5 KM

MRC CDR

AT PLT

NBC TM

ENGR PLT (+)
(MOVEMENT SUPPORT DETACHMENT)

0    0—400M    400—1000    1 KM    1—2 KM    2—2.5 KM    3KM
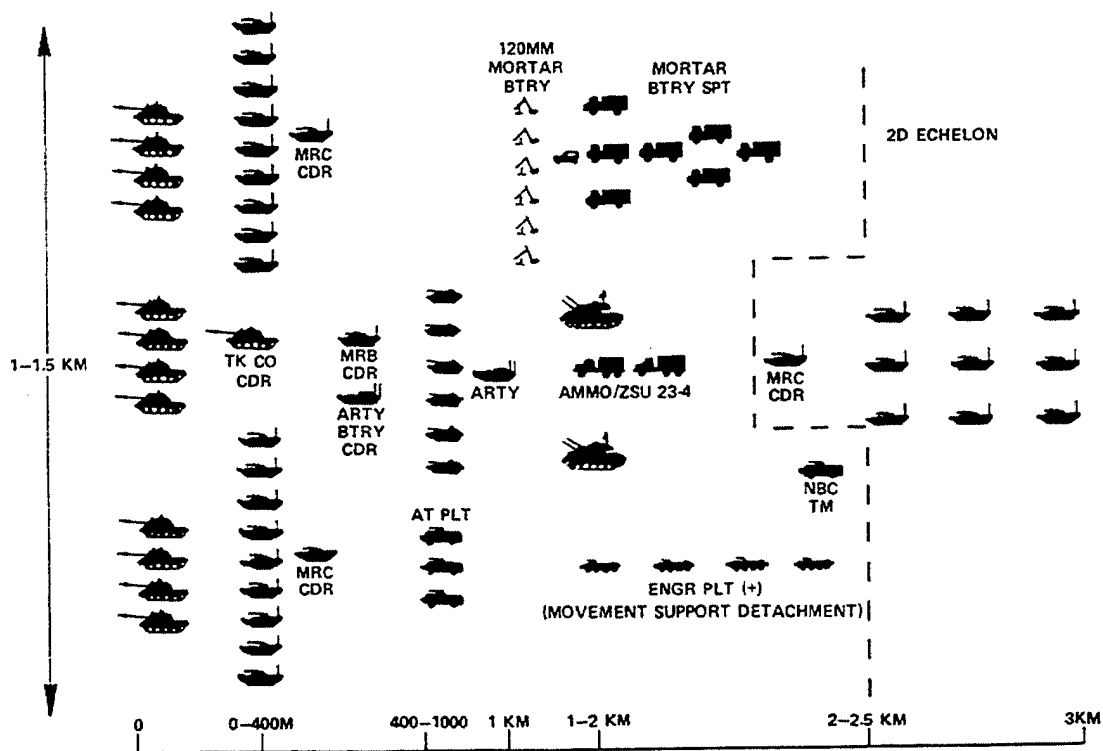
RWS MAP PE #3 (Map Utilities)

## DEPLOYMENT LINES FOR ATTACK
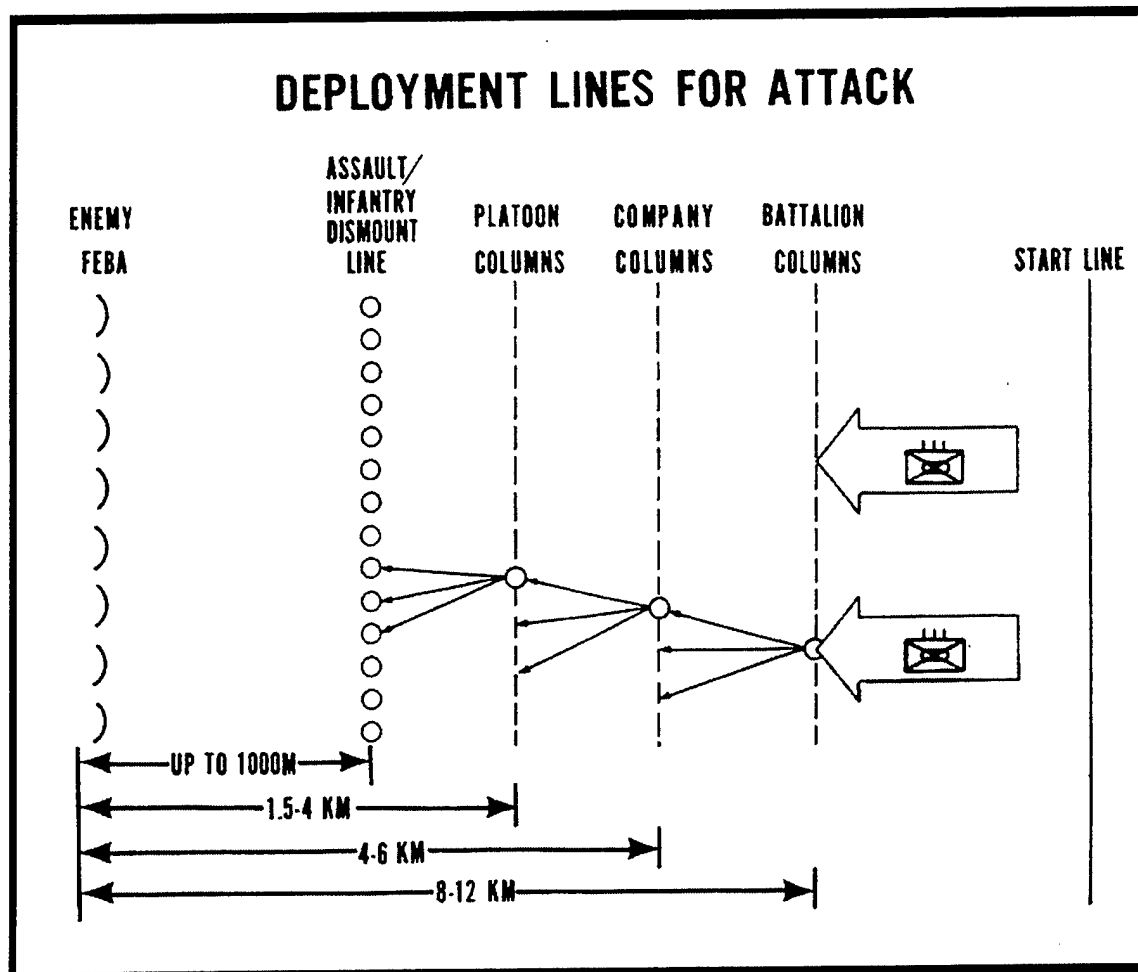
The ASAS-RWS contains a number of utility functions that permit simple procedures to be accomplished rapidly, permitting your energies to be focused toward analysis, intelligence production, and determining the answers to priority intelligence requirements (PIR). To employ these tools effectively you must be well grounded in basic military skills. Map reading and military symbols are two of those areas. Selection of an incorrect symbol or misreading the map can now be done at a more rapid rate and the spread of confusion and error can now be done at lightening speed.

Pay close attention to detail, research what you do not know, and make sure information that you provide is accurate.

## REQUIREMENT

During this exercise you will perform as an Analyst in the G2 Operations Section of the 2$^{nd}$ Infantry Division. A foreign

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liaison team from an allied Pacific nation will be working with the G2 and G3 Operations' staffs. The allied unit includes a long-range reconnaissance element that will be providing support and reports to the 2nd Infantry Division. Your NCOIC wants to insure that no confusion occurs over map symbols. She has provided a list of map symbols that she anticipates will to be used for friendly and enemy units during information exchanges. She will review these symbols with the liaison team. Plot the symbols in a row using Draw Entity. You may use standard U. S. abbreviations for supplemental information, if required.

A.  ENEMY CORPS HEADQUARTERS

B.  FRIENDLY INFANTRY DIVISION

C.  ENEMY AIR DEFENSE MISSILE BATTERY

D.  FRIENDLY ARMOR BATTALION

E.  FRIENDLY FIELD SELF-PROPELLED ARTILLERY BATTERY

F.  ENEMY BRIDGING PLATOON

G.  FRIENDLY MECHANIZED INFANTRY BRIGADE COMMAND POST

H.  ENEMY MOTORIZED INFANTRY BRIGADE

I.  ENEMY TRUCK TRANSPORTATION COMPANY

J.  ENEMY ELECTRONIC WARFARE COMPANY

K.  AIR DEFENSE RADAR INSTALLATION

L.  EARLY WARNING INSTALLATION

M.  ENEMY UNMANNED AERIAL VEHICLE BATTALION

N.  FRIENDLY AIRBORNE INFANTRY BATTALION

O.  ENEMY FIELD ARTILLERY OBSERVATION POST


1.  Did you find symbols for all elements listed?

2.  Is more than one symbol available for a unit, installation, or element on the list?

    If so, plot them side by side for comparison.

3.  Your NCOIC has some concerns over interpretation of unit symbols and standardized unit labeling fields. Supplement the selected

symbols with additional information in labeling fields:

    D.  1st Battalion 81st Armor, 4th Brigade, 2nd Infantry Division

    F.  3rd Platoon, 1st Company, 12th Engineer Regiment

    H.  4th Brigade, 815th Mechanized Infantry Corps, 1st Combined
    Arms Army

Prebrief your NCOIC on the symbols you plotted.

RWS MAP PE #4 (Map Utilities)

The ASAS-RWS permits the rapid conversion of geographic location information.  Joint and Combined operations and the variations in the location reporting of other armed service, theater, national, and allied collection systems make rapid conversion of geographic information a necessity for timely report processing and intelligence production.  For systems that communicate directly to ASAS or linked processors, this conversion occurs automatically. The diversity of operations, however, makes this a high demand capability in an operational environment.  To employ these tools effectively you must be well grounded in basic military map reading and terrain appreciation skills.

Pay close attention to detail, research what you do not know, and make sure information that you provide is accurate.

You are an Analyst in the G2 Operations Section of the 2$^{nd}$ Infantry Division. The Division Targeting Team is meeting to refine target lists and planning for tactical air target nominations for strike missions tomorrow.  They are also verifying data from the current Air Force air-tasking order (ATO).  G2 Operations Officer just emerged from the meeting with a list of requirements.  You are to provide him the information as soon as you have done the location conversions and obtained the data required.  Your NCOIC is to be briefed before you take the data into the meeting.

## REQUIREMENTS

1. What are the geographic coordinates (latitude and longitude) for the Universal Transverse (UTM) Grid of 52SCS270970?

2. What is the World Geographic Reference System (GEOREF) coordinate for 52SCS1989?

3.  What is the center of mass UTM grid for SEOUL?

4.  NO FIRE AREAS are being considered.  What type of man- made feature is located at 52SCS26388024?

5.  What city is at 52SCS42029528? What is the LAT LONG for the city? What map scales are available for this area?

6.  What structure is at 52SCS05688132?  Apply a quick plot to it.

7.  What is located at 38°08'34"N 127°18'41"E?

Brief your NCOIC.  Be prepared to demonstrate the methods that you used to arrive at this data.

RWS MAP PE #5 (Terrain Tools)

In addition to location and location conversion information, the ASAS-RWS provides other map utility functions. Altitudes and linear measurements can rapidly be determined. With careful use, the measurement tools permits accurate determination of distances along irregular routes such as roads, valleys, and rivers. Time and travel factors can also be determined. To employ these tools effectively you must be well grounded in basic military map reading and terrain appreciation skills.

Pay close attention to detail, research what you do not know, and make sure information that you provide is accurate.

You are an Analyst in the G2 Operations Section of the 2$^{nd}$ Infantry Division. The G4 Plans Section at the Division Main Tactical Operations Center is developing logistics support plans for future operations. Your NCOIC has tasked you to assist by providing information to support this planning. Their initial focus is centered on the towns of Eujongbu (**Uijongbu**) and Geomchan (**Kumch'on**). Provide the answers to the following: (Use 1:250,000 scale map; Geomchan is West of Eujongbu.)

## REQUIREMENTS

|  | **Eujongbu** | **Geomchan** |
|---|---|---|

1. Coordinates (UTM) _____  _____  (center mass)

2. Elevation _____m  _____m  (center mass)

3. What is the name of the major highway between the two towns?

_____

4. What is the road distance between the two towns?
_____km. (+/- 1 km)

5. What is the travel time for vehicles moving at an average speed of 45 kph between the two towns? _____ (+/- 2 min)

6. What is the straight-line distance between the two towns?
_____km. (+/- 0.5 km)

7. Some resupply and medical evacuation missions may be performed by UH-60 BLACKHAWK Helicopters.  What is the flight time between the cities at an average speed of 120 knots (138 mph)?
_____ (+/- 2 min)


Prebrief your NCOIC on the data developed.  What techniques did you use to obtain the information?  Are alternate techniques available?

### RWS MAP PE #6   (Terrain Tools)

In addition to location and location conversion information the
ASAS-RWS provides other map utility functions.  Altitudes and linear
measurements can rapidly be determined.  With careful use the
measurement tools permits accurate determination of distances along
irregular routes such as roads, valleys, and rivers.  Time and
travel factors can also be determined.  To employ these tools
effectively you must be well grounded in basic military map reading
and terrain appreciation skills.

Pay close attention to detail, research what you do not know, and
make sure information that you provide is accurate.

You are an Analyst in the G2 Operations Section of the 2$^{nd}$ Infantry
Division.  The Counterintelligence Section is developing a counter-
RSTA plan in conjunction with the G3.  The G3's OPSEC plan is being
developed to nullify enemy collection efforts.  Your expertise with
ASAS has won you the opportunity to assist the CI Section.  Complete
the requirements and brief the CI Section NCOIC on the results of
the data.

## REQUIREMENTS

A. At a speed of 125 knots (144 mph), how long will it take an
aircraft to travel from Kaesong to Suweon? _____   (+/- 1 min)

B. At 30 kph, how long will it take for a water craft to travel from
the P'altang Tangyo Bridge 52SCS44485616 to the Neutral Zone
(52SBS94408255)?  _____        (+/- 5 min)

C. Would a LP/OP at the hilltop located at 52SCS22527680 be able to
spot vehicles traveling on highway 39 and 349?  -
_____.  What areas could be observed from this
hilltop? _____

D. What altitude setting would you use for visibility diagrams if
you are considering a standing man? _____   If you are
considering observation from a man "dug in a hide"? _____

E. What is the straight line distance from LP/OP (in question C
above) to the city of Dongducheon in kilometers and miles?
_____km/_____miles

F.   What is center of mass elevation of the LP/OP in question C above? _____

G.   Vehicular traffic over the road and rail bridges in the vacinity of the intersections of Highway 39 and Highway 349 (5km West of Eujongbu) needs to be under constant surveillance.   The G3 is reluctant to place a team within 1000 meters of the bridges. Identify the terrain that could be a suitable for a "hide site" for a surveillance team.

_____

_____

## RWS Database PE #7

In order for intelligence to be effective it must be timely,
relevant, accurate, and predictive.  The tools and capabilities of
ASAS and the ASAS-RWS are designed to assist you in your mission of
providing effective intelligence support.  Having learned some of
the system's utilities and map tools and capabilities, you will now
explore databases in the system.

The digital databases and manipulation capabilities of the ASAS-RWS
provide the user with the ability to rapidly view, query, display,
and compare items of information.  The results of your queries is
information that satisfies intelligence requirements, and text or
graphic products that can be rapidly disseminated to users.

To permit you to experience various applications of the system and
the interface that the Intelligence Battlefield Operating System has
with other Battlefield Operating Systems, the situation and your
role will vary.

During this next exercise you will perform your duties as an Analyst
in the Brigade S2 Section of the $2^{nd}$ Brigade, $2^{nd}$ Infantry Division.
Your Brigade was deployed to initial general defensive positions
three days ago.  The Brigade has been involved in heavy fighting in
the defense of South Korea.  The situation has stabilized over the
past 4 hours.

The Division Main Operations Center (D-MAIN) has just completed
relocation in preparation for an anticipated reinforcement and
change of mission.  The G2 at D-MAIN experienced some communications
problems prior to the jump.  The G2 Operations NCOIC called about 20
minutes ago to inform the Brigade that the ACE is working to reduce
the backlog and complete processing message traffic.  The EDC was
being delayed pending this processing and receipt of additional
updates from I Corps LRS teams and GUARDRAIL.

The EDC has now been received.

### REQUIREMENTS

Your NCOIC wants you to access and review the databases before you update any displays
or products.  The Graphic INTSUM for the battalions is not due for 2 hours, so you have one
hour to complete the review tasks and provide the data for your NCOIC.  Access the SITMAP
table.

A. How many records are currently listed in the table?        _____

1). Make a list of the data fields.  With a short sentence or a word or two define each data field.  (You may wish to set this aside for a reference.)

2). Draw a standard military unit map symbol.  What data fields relate to the data fields used on these symbols?

3). How do these data fields relate to information that you will use to determine order of battle factors, enemy activities, and unit strengths?

4). How can these data fields be used to assist your analysis and to determine probable courses of action?


B. Your NCOIC is proactive.  He knows that understanding the enemy's major unit deployments, operational maneuver, and objectives, "the big picture" will assist the analytical effort at the Brigade.  Access the SITMAP table from the active table list.  Use your field operators for the searches listed below.  Do each search individually from the whole list.  (**NOTE:** Keep in mind that this is an EDC from the Division and you are viewing records for the Division's area of interest.)

1). Fetch all regimental size units.  How many records met your criteria?                                                                        _____

2). How many records have allegiance of KN?            _____

3). How many records have allegiance of EX?            _____

4). How many units are "Attacking?"                    _____

Brief your NCOIC.


C. Your briefing has prompted additional questions.  Answer the following questions. (**Hint:** Close the table and access the database pull-down menu, select "Report on Table by SQL").

1). Fetch all ARTY units.  How many artillery units are reflected?

                                                       _____

2). How many Mechanized Infantry Battalions are there?      _____

3). How many CPs are identified?                            _____
(If a command post is not identified for a unit what does that mean?)

4). How many Corps are identified?                     _____

(Are all identified Corps in your area of interest subordinate to the 1<sup>st</sup> CAA?  What is the significance of your answer?)

5). Are there any apparent duplicate records or possible errors in the database?  If so, what records may be errors?      _____

Brief your NCOIC on the results of your database review and recommendations.

### RWS Database PE #8

You and the database are now ready to begin providing timely, relevant, accurate, and predictive intelligence. The database query and manipulation capabilities of the ASAS-RWS can assist in the providing your commander, supported units, and the staff with intelligence information needed to accomplish the unit mission.

You will continue your duties as an Analyst in the Brigade S2 Section of the 2nd Brigade, 2nd Infantry Division. With an updated and clean database now on hand and a few minutes to spare, the S2 is reviewing the other intelligence requirement (OIR) files. He has identified a number of open requirements that may now be answered from the database.

## REQUIREMENTS

1. The Brigade Fire Support Element Chief has requested information on artillery units not assigned to 2nd Infantry Corps that are capable of supporting operations against the 2nd Infantry Division (U.S.) sector. Answer this OIR from the SITMAP Table (Use the Report on Table by SQL capability):

A. Which artillery units are subordinate to the 20th Infantry Corps? _____

B. How many self-propelled artillery units are identified in the area of interest? _____

(Are MRL units self-propelled? Better provide both numbers with some clarification.)

2. In anticipation of a mission change, the S3 Battle Captain is assembling the data needed for wargaming and force ratio determination. You are about caught up and your NCOIC tells you that you have a choice, go refuel and check the generators or pull up the data for the S3. SP4 Murray, your shift mate, grabs his rifle and helmet then speeds out the blackout curtain.

Your guidance for the S3 requirement is: Pull (fetch) the records for all battalion-sized units, display the report, and index it on parent unit number in ascending order. Notify your NCOIC (instructor) for his review when finished.

3. The S2 has almost cleaned out his OIR file. In preparation for a situation briefing for the Brigade Commander and a newly assigned Battalion Commander, your NCOIC is updating the order of battle

displays on the S2 wing of the S2/ S3 Situation Map. (These are the same images that you have in your paper order of battle reference file.) Using the search tools and capabilities of the ASAS-RWS, provide the following data:

A. What units are identified as subordinate to the 21$^{st}$ and 23$^{rd}$ Infantry Division, 2$^{nd}$ Infantry Corps?

B. What other infantry divisions have been identified? Are any Mechanized Infantry or Tank Brigades identified? To what units are these Brigades subordinate?

C. What artillery battalions have been identified?

D. Which artillery battalions are identified as in position and ready to fire?

What other status or activity indicator is identified with artillery units? What is the significance of this activity? (Keep in mind that artillery units train for emergency fire missions or "hip shoots" to rapidly transition and provide fires from the march. The three (3) most critical factors in determining availability to support a course of action are range, range, and range.)

E. The S2 just spoke to the ASPS Chief at 2$^{nd}$ Infantry Division. Based on varied source reports and BDA, all infantry regiments of all divisions subordinate to 2$^{nd}$ Infantry Corps are assessed as being at or below 27% strength. The I Corps G2 concurs with this assessment. Modify your database to reflect this significant combat power assessment.

Provide a briefing to your NCOIC. Show the results of your queries and the database change. Provide your assessment of the situation.

**Note:** SP4 Murray just returned covered with grease all over him. Your NCOIC had him change the oil and service both generators since he was so quick to volunteer. He wants you to show him a little more about ASAS-RWS.

### RWS Database PE #9

To fully understand the battlefield it must be viewed from both the perspectives of the enemy and friendly forces. In previous instruction you have learned that weather and terrain influence both enemy and friendly capabilities and courses of action. It is important that your analysis be performed in the context of our mission, dispositions, and commander's intent, and not merely focused on the enemy.

To be of value, every intelligence assessment or analytical product should be evaluated against or update the current intelligence estimate. The conclusions of the intelligence estimate should always provide:
1. A determination of the effects of intelligence considerations on the operation (Can the IEW battlefield operating system support the mission or course of action?)
2. A determination of the effects on the area of operations (AO) on our mission, or selected course of action
3. A determination of the enemy's probable enemy course(s) of action
4. A determination of enemy vulnerabilities (What specific peculiarities and weaknesses may be exploited by the friendly force? For maneuver forces, vulnerabilities are those things that you can maneuver against or shoot at.)

To maintain this perspective, enemy actions must be considered against friendly dispositions, actions, and reactions.

You continue to be an Analyst in the Brigade S2 Section of the 2nd Brigade, 2nd Infantry Division. You have been updating the weatherboard and other information displays in the TOC. Your buddy, SP4 Murray, has been working to update the friendly situation in the ASAS-RWS. Normally the Maneuver Control System (MCS) would populate this database, but there have been problems with file output from MCS. The file is out of date and has been purged. Now with the lull and pending change of mission, the Brigade XO wants it fixed.

MSG Jones from the S3 Section was talking to your NCOIC, it seems that the Brigade XO is unhappy about something else, the S2's generators. Your NCOIC has a quick word with SP4 Murray about a big mess, remedial generator training, "seeing the Company Commander", and "if there wasn't a war on". They start outside.

His last words to you are to "get the friendly database loaded ASAP".

## REQUIREMENT

You find Murray's notes (only notes, no data was entered):

| MSG FROM | CC | ENTITYID | LOCATION | ACTIVITYDTG | PERID | SYMBOLID |
|----------|-----|----------|----------|-------------|-------|----------|
| 52 ID ACE | US | 2 | 373610N1270821E | 250200ZDEC98 | | MECH-DIVCP |
| 52 ID ACE | US | 1 | 374402N1271043E | 250200ZDEC98 | 2 MECH DIV (US) | MECH-BDE |
| 52 ID ACE | US | 2 | 374051N1270441E | 250200ZDEC98 | 2 MECH DIV (US) | MECH-BDE |

Other information on 2ID and US Units provided by the S3:
3rd Bde (MECH), 2nd ID located 373808N1265801E at 250200ZDEC98
2nd ID DIVARTY located 374046N1271130E at 250200ZDEC98
5th Bde (ARMOR), 2nd ID located 373915N1270921E at 141804ZAPR99
4th Bde (ATK HELO), 2nd ID located 373538N1271017E at 141805ZAPR99

Division CP, 25th Infantry Division (Lt) located 374414N1271934E at 141755ZA
1st Bde, 25th ID located 374527N1271528E at 141752ZAPR99
2nd Bde, 25th ID located 374856N1272010E at 141753ZAPR99
3rd Bde, 25th ID located 374656N1272045E at 141754ZAPR99
DIVARTY, 25th ID located 374348N1271921E at 141759ZAPR99

Republic of Korea Army Units:
1st Regiment, 15th ID located 373817N1265224E at 141734ZJAN99
2nd Regt, 15 ID located 373933N1264734E at 141742ZAPR99
3rd Regt, 15 ID located 373522N1265119E at 141744ZAPR99
CP 15th INF DIV (MECH) located 373559N1265215E at 141745ZAPR99
15th Armor Battalion, 15 ID located 374121N1264558E at 141746ZAPR99
Artillery Regiment, 15 ID located 373615N1264553E at 141748ZAPR99

Be careful with your work.  The NCOIC is a little hot about Murray.
Remember you can work together, **but** all ASAS-RWS must have an
accurate, friendly situation database loaded.

Be prepared to brief your completed task and the overlay developed
to your NCOIC.

NOTES:  Access SITREP database from the 'DATABASE' pulldown menu or
select the 'DATA' hotbutton. Select 'Edit Table'. Select Arrow
Pulldown under All Tables and scroll down to and highlight 'SITREP' database
Add to active list and highlight.  Select 'Open Table at
the bottom of Table Editor window.  Select 'Fetch All' to verify
that the table is empty.  If empty, no data will populate any of the fields
and a message stating 'Table empty' will appear at the bottom
of the window.

Prior to filling in the data in the appropriate fields identify and
left click on 'MESSAGEID' then left click on 'Insert Unique Id'.
This will auto-populate the MESSAGEID field.  After giving the record
 a particular system ID, fill in the data from each line.  Once you

have filled in the data to the record from each line, select 'Add'.

This will add the record to the table.  Continue to add records until complete.  Do not forget to 'Add' the record after you have entered the data for each line.

### RWS MAP PE #10 (Node Operations)

In the previous exercise you reviewed an EDC and after some minor
database correction, you used the database to satisfy intelligence
requirements.  Most tactical intelligence requirements are event,
location, and/or time oriented.  "Seeing the battlefield" is
critical to your analysis and satisfying the requirements of our
commanders and other customers.  This visualization is best
accomplished when enemy units are viewed on the terrain and in the
context of their current or projected actions.  Our most important
analytical tool is an up to date situation map.  In this exercise
you will learn to employ the database and graphic tools of the ASAS-
RWS to create an enhanced situation map display.

You will also use the equipment database to determine additional or
supplemental information to improve the accuracy and completeness of
your graphic product.

You are an Analyst in the Brigade S2 Section of the 3$^{rd}$ Brigade, 2$^{nd}$
Infantry Division.  The Brigade TOC has just relocated to a hardened
facility.  Additionally, the Brigade has received a warning order
from the 2$^{nd}$ Infantry Division.

The warning order states, "I Corps and 2$^{nd}$ Infantry Division conduct
offensive operations to destroy the advancing mechanized infantry
and tank brigades and enemy artillery and rocket forces deployed to
support the enemy attack.  On order, 2$^{nd}$ Infantry Division will
facilitate passage of the 1$^{st}$ Cavalry Division to continue the attack
and follow and support the 1$^{st}$ Cavalry Division."

The Brigade's mission will be to attack along a broad front to fix
and defeat the defending elements of 2$^{nd}$ Corps and prevent their
repositioning.

The Brigade XO is at the Division MAIN CP now and is returning with
preliminary details on the new plan.  Most details, however, are
still being developed.  The Brigade Commander is completing his
inspection of forward defenses.  Both will return to your location
soon.  The S2 is preparing to brief the Commander, XO, and S3 on the
updated enemy situation.  His analysis is focused on enemy units
capable of defending, reinforcing the forward defenses, or
supporting enemy offensive operations.  You will create an updated
situation map to assist in his analysis and the briefing.

**REQUIREMENT**

1. Plot the SITMAP table (database).  (**NOTE:** Ensure that symbol size
is set to small.  Scale in to 1:250,000 with the map centered at the

coordinate CS280970.)

Can you read all of the symbols and labels?

What system graphics, capabilities, or options can you use to improve visual clarity of the situation map?

List your ideas. What other techniques are available?

Using these techniques create an understandable and readable overlay or map product. Multiple overlays or variations in map scale may be required.

2. Check your work. Are all critical units accounted for?

Review the order of battle file. What amphibious units would be most likely to conduct assault river crossings?

Have you reviewed the EQUIPMENT Database for signature equipment comparison?

Notify the S2 NCOIC (your instructor) when completed. Be prepared to brief the techniques that you used to develop the product.

U.S. Army Intelligence Center
Practical Exercise

ARI Map PE#12
ASAS-RWS
18 April 00
**DRAFT**

### RWS MAP PE #11 Node Operations)

In the previous exercise you created a situation map to support analytical efforts and compared equipment and situation databases to refine information.  In this exercise you will continue to refine your analytical skills using the query and graphics capabilities of the ASAS-RWS.

For this requirement you be an Analyst in the I Corps Artillery G2. Corps Artillery is in receipt of the attack warning order.  To support the offensive operation, the Corps Artillery Commander desires to initially concentrate the deep attack capabilities of I Corps against concentrations of long-range, tube artillery and multiple rocket launchers that the enemy may be massing to support a breakthrough.  Air defense systems positioned to protect this artillery and routes of advance are also high value targets (HVTs).

The Corps will employ available tube artillery, MLRS, ATACMS, along with attack helicopters.  Additionally, the Corps has been allocated Air Force and Naval tactical air sorties and Naval gun and missile fires.

The target program is being developed in the Corps Artillery TOC and in conjunction with the Corps Fire Support Element collocated with the Corps G3.  It is critical that potential targets be identified and refined as rapidly as possible.  Your situation development and analysis is being done in support of targeting.

## REQUIREMENT

Clear the map (save your overlays) and plot the following units and equipment and answer the associated questions:

A.  <u>MRL Units</u>

   Which multiple rocket systems are available to units in the 1st CAA?

   Where are these MRL units currently located?

B.  <u>Arty Units</u>

   Is any massing of artillery apparent?

   What are the characteristics of an artillery group?

What artillery headquarters would most probably be positioned to provide command and control for a Corps Artillery Group (CAG) supporting the 2$^{nd}$ Infantry Corps?

What types of artillery systems are available in the 2$^{nd}$ Infantry and 815$^{th}$ Mechanized Infantry Corps?

C.    Surface to Surface Missiles (SSM) Units

What SSM units have been located?

Current weather and atmospheric conditions are essential for the accurate targeting of SSMs, rockets, and artillery.  Radar activity may be an indication of SSM launch or artillery preparation.  Has any meteorological radar activity been reported?

D.    Surface to Air Missiles (SAM) Units

What air defense units are identified which protect forward defenses, artillery, and / or routes of advance?

A lack of air defense units identified in our AI may indicate that the enemy has reduced active air defense radar emissions. Effective targeting and electronic suppression can have that impact.  Under these circumstances, aerial surveillance and target acquisition radars operating in a "safer" environment may cue air defense firing units.  Have any BAR LOCK, FLAT FACE, SPOON REST, or other early warning radars been reported?

Be prepared to brief your products and results to the Corps Artillery G2 (Instructor).  (**NOTE:** Remember the lessons learned in the previous Requirement.  Multiple overlays, variations in color, and map contrast changes may be required to develop a readily usable product.)

C-38

U.S. Army Intelligence Center
Practical Exercise

ARI Map PE#13
ASAS-RWS
18 April 00
**DRAFT**

## RWS MAP PE #12 (Node Operations)

In the previous exercise you employed various query and graphics techniques to assist your situation development effort in support of targeting. In this exercise you will continue to refine your analytical and ASAS-RWS graphics skills to support the decision process and satisfy commander's priority intelligence requirements.

The Corps Artillery CG was most impressed with your ability to assist him to "see the battlefield". He has a better perspective of priorities, what targets to attack, and when to attack them in order to maximize destruction and disruption.

The Corps Artillery Commander has directed a detailed target value analysis (TVA) of Eujongbu, the lines of communication running through the town, and the artillery units located near the town. The Corps Artillery G2 has identified that the firing units of the 72$^{nd}$ Artillery Brigade and 63$^{rd}$ Multiple Rocket Launcher Brigade are high value targets (HVTs) for this operation. He is convinced that these elements present the greatest danger to success of the I Corps operation.

The I Corps G3, however, continues to be focused on maneuver forces, the advancing mechanized brigades of the 815$^{th}$ Corps. He is convinced that these units are the priority high-payoff targets (HPTs). The Corps G3 wants these units to receive the highest priority for targeting and destruction.

**REQUIREMENT**

Your mission is to develop a simple graphic for the Corps Artillery Commander to brief the I Corps CG.

Your NCOIC has provided the following guidance. Center a map at Eujongbu at 1:500,000, scale. Draw a circle showing a 30 KM (approximate) radius from the center of Eujongbu. Plot the controlling headquarters and selected range fans for the arty/mrl units in the CAG forming to the Northwest of Eujonbu. Indicate on the graphic the number of battalions and calibers or weapons represented.

Your NCOIC wants to see your work when completed. The Corps CG will be in your TOC in 30 minutes.

(**NOTE**: You may use overlays and data from the previous requirements. Use the overlay and map techniques that will provide the best visual

product. Keep it simple. The Corps Artillery Commander wants the graphic [picture] to say it all.)

# Appendix D
## Experimental Practical Exercise

# ASAS – REMOTE WORKSTATION
## INSTRUCTIONAL EVALUATION

**NAME:** _____

**CLASS NUMBER:** _____

**SSN:** _____

**INSTRUCTOR:** _____

**DATE OF EVALUATION:** _____

*Administrative Note:* *You may use notes, handouts, products created during class, and other reference materials that you may have. Use the assigned RWS to answer the performance-related questions.*

**SITUATION:** For this evaluation you are an analyst in the G2 Operations Section of the 2$^{nd}$ Infantry Division. On order the Division to attack to is preparing to attack on order to destroy the 2$^{nd}$ Corps and mechanized elements massing to continue the attack. The Division will facilitate the passage of the 1$^{st}$ Cavalry Division and follow and support the 1$^{st}$ Cavalry Division. The friendly and enemy situations are as depicted in the previous exercises, the EDC message, and updates and edits that you have made to the database.

The Corps Commander is basing the timing of the attack on three factors:

1. Movement and closing of the 1$^{st}$ Cavalry Division into attack positions behind 2$^{nd}$ Infantry Division. The 1$^{st}$ Cavalry Division must be closed in these attack positions prior to the 2$^{nd}$ Infantry Division crossing the line of departure.

2. Containment and destruction of the Mechanized and Tank forces of the 815$^{th}$ and 820$^{th}$ Corps moving South to continue the attack. Of these forces neutralization of the 5$^{th}$ Brigade, 815$^{th}$ Mechanized Corps is critical to force the enemy to rethink assault river-crossing plans, timetable for his attack, and sequencing of forces into the attack.

3. The last and most critical factor of the Corps Commanders decision is the destruction or neutralization of missile and long-range rocket and artillery massing to support the continuation of the enemy attack or the defense. The 72$^{nd}$ Artillery Brigade and the 63$^{rd}$ MRL Brigade must be reduced to below 50% strength.

Your principle task will be to assist the Division G2 and G3 Operations Sections in tracking the status of preparations and information answering the commander's critical information requirements (CCIR) and the priority intelligence requirements (PIR). Battle damage assessments (BDA) tracking will be an essential aspect of this task.

## REQUIREMENTS:

1. The Division Air Force Liaison Officer (ALO) has reported to the G3 Operations Officer and the Fire Support Element (FSE) Chief that his flight of 6 F-16s have performed their egress on Air

Corridor ALICE. They reported destruction of 7 KOKSAN Guns and 9 heavy trucks, with 3 major secondary explosions at 52SCS203857. Additionally, a battery of 6 probable 152mm towed guns and 18 trucks were struck due East of that location with Rockeye. Good target coverage with an estimate of heavy enemy casualties and all guns and trucks out of action.

A. What enemy units did the F-16s attack?

    (1). _____

    (2). _____

B. Determine the combat effectiveness of these units, update the database, and record your data below.

    (1). _____ at _____ %

    (2). _____ at _____ %

2. The Assistant Division Aviation officer is briefing the G2 and G3 Ops Sections on their planned night mission to strike two elements of the 63rd MRL Brigade tonight at 2230 with one attack helicopter company (8 AH-64s). Due to the close terrain, the attack will use speed and stealth and employ the 30mm guns and the 2.75-inch rockets with the M261 HE Multipurpose Submunitions for area target attack. The aircraft will enter Air Corridor ROCK at 52SCS197658 and proceed at a speed of 100 knots (185 kmph) to 52SCS065792. They then turn on Air Corridor SNAKE and proceed at 81 Knots (150 kmph) to Air Control Point (ACP) 4 at 52SCS180861. ACP 4 is the Release Point (RP). The Engagement Area (EA) LONE RANGER includes the enemy firing battalions at 52SCS199922 and CS211914.

Given the speeds and route, from the time that the attack company enters ROCK until it exits sSNAKE at ACP4:

A. What distance, in kilometers, will the company travel? _____

B. What is the travel time from entry point to release point? _____ min. _____ sec.

3. Simultaneously the Attack Battalion (-) will strike the lead elements of the 5th Brigade, 815th Corps in EA SLAM. The EA is bounded by 52SCS276862, 52SCS297872, 52SCS272802, and 52SCS292812. The Battalion has selected battle positions along the West side of the EA SLAM. A platoon will occupy remote designation positions to laze targets for Hellfire missile engagements. These positions are selected around the EA to minimize dead space and increase kills. The remote designation positions selected are 52SCS286805 - RDP-1, 52SCS268857 - RDP-2, and 52SCS299861 - RDP-3.

The G2 Ops and Collection Manager are concerned about cross cueing collection systems to providing early warning to the Attack Battalion and providing last minute details on the probable target array in the EA.

A. Plot and label EA SLAM on an overlay in blue at 1:50,000 scale. Label the overlay with your last Name and class number.

B. Plot, in yellow, and label the visibility from the three (3) remote designation locations using a hover altitude of 20 feet or 6 meters above ground level.

C. Save the graphic produced as and image file (your last name, first initial, and EA SLAM).

D. What are the actual (terrain) elevations for each remote designation position?

      (1). RDP-1 _____

      (2). RDP-2 _____

      (3). RDP-3 _____

4. The Division Chief of Staff is concerned about the ability of the artillery regiments of the forward enemy divisions to influence the battle when the 2nd Infantry Division attacks. On a separate overlay and at 1:250,000 scale, plot the artillery regiments of the 21st, 23rd and 25th Infantry Divisions of 2nd Corps in red. Once located plot the range fans of the longest range weapon system available in these regiments, the BM-21 multiple rocket launcher, in brown.

Have any subordinate firing battalions to these regiments been located? If so plot these subordinate units to the overlay in the color magenta.

Save this graphic as an overlay (last name, 1st initial.)

5. The I Corps attack helicopter battalion was returning from a deep attack and observed the emplacing a minefield in the forward defensive area. The barrier was observed from 52SCS339816 to 52SCS345818 to 52SCS350824. The preparation of fortified line and defensive trench work was observed in the same area from 52SCS334818 to 52SCS338822. The time of the report is 16 May 00 at 1400.

Post this data on your map and save the map as an image file (your last name and first initial) and transfer the image to **1_BDE_TT**.

Notify your instructor when you complete this part of the evaluation.

**Part 2**

**SITUATION:** You are an analyst in the G2 Operations Section of the 2nd Infantry Division. On order the Division is preparing to attack to destroy the 2nd Corps and mechanized elements massing to continue the attack. The Division will facilitate the passage of the 1st Cavalry Division and follow and support the 1st Cavalry Division. The friendly and enemy situations are as depicted above, the EDC message, and updates and edits that you have made to the database.

The Corps Commander is basing the timing of the attack on three factors:

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Mechanized Corps is critical to force the enemy to rethink assault river-crossing plans, timetable for his attack, and sequencing of forces into the attack.

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Your principle task will be to assist the Division G2 and G3 Operations Sections in tracking the status of preparations and information answering the commander's critical information requirements (CCIR) and the priority intelligence requirements (PIR). Battle damage assessments (BDA) tracking will be an essential aspect of this task.

## REQUIREMENTS:

1. The Assistant Division Aviation officer is briefing the G2 and G3 Ops Sections on their planned night mission to strike two elements of the 63$^{rd}$ MRL Brigade tonight at 2230 with one attack helicopter company (8 AH-64s). Due to the close terrain, the attack will use speed and stealth and employ the 30mm guns and the 2.75-inch rockets with the M261 HE Multipurpose Sub munitions for area target attack. The aircraft will enter Air Corridor ROCK at 52SCS197658 and proceed at a speed of 100 knots (185 kmph) to 52SCS065792. They then turn on Air Corridor SNAKE and proceed at 81 Knots (150 kmph) to Air Control Point (ACP) 4 at 52SCS180861. ACP 4 is the Release Point (RP). The Engagement Area (EA) LONE RANGER includes the enemy firing battalions at 52SCS199922 and CS211914.

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A. What distance, in kilometers, will the company travel? _____

B. What is the travel time from entry point to release point? _____ min. _____ sec.

2. Simultaneously the Attack Battalion (-) will strike the lead elements of the 5$^{th}$ Brigade, 815$^{th}$ Corps in EA SLAM. The EA is bounded by 52SCS276862, 52SCS297872, 52SCS272802, and 52SCS292812. The Battalion has selected battle positions along the West side of the EA SLAM. A platoon will occupy remote designation positions to laze targets for Hellfire missile engagements. These positions are selected around the EA to minimize dead space and increase kills. The remote designation positions selected are 52SCS286805 - RDP-1, 52SCS268857 - RDP-2, and 52SCS299861 - RDP-3.

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B. Plot, in yellow, and label the visibility from the three (3) remote designation locations using a hover altitude of 20 feet or 6 meters above ground level.

C. Save the graphic produced as and image file (your last name, first initial, and EA SLAM).

D. What are the actual (terrain) elevations for each remote designation position?

      (1). RDP-1 _____

      (2). RDP-2 _____

      (3). RDP-3 _____

Notify your instructor when you complete the evaluation.

# Scoring Sheet
Scoring Key
Fort Huachuca Data
May 2000

_____ 1. 5<sup>th</sup> Battalion or 72<sup>nd</sup> Artillery Brigade *(Plot database entity)*

_____ 2. 5<sup>th</sup> Bn 72<sup>nd</sup> Arty at 22% or ___ at 67 % (*Edit database)*

_____ 3. 32 kilometers *(Estimate distance)*

_____ 4. 11 min *(Determine rate of march)*

_____ 5. 150 to 175 *(Determine point elevation)*

_____ 6. 102 to 135 *(Determine point elevation)*

_____ 7. 146 to 167 *(Determine point elevation)*

_____ 8. _____ Is the engagement area plotted on the overlay? *(Plot/Create entity)*

_____ 9. _____ Is the EA plotted in BLUE? (*Use draw pallet)*

_____ 10. _____ Is the EA SLAM labeled *(Post text to map)*

_____ 11. _____ Are the visibility diagrams for the 3 mote designation locations plotted? (*Determine field of view, Determine point elevation)*

_____ 12. _____ Are the visibility diagrams displayed in YELLOW? (*Use draw pallet)*

_____ 13. _____ Is the overlay at 1:250,000? *(change scale)*

Are the following items posted?
_____ 14. _____ Arty Regt/21<sup>st</sup> Inf Div (*plot database entity)*

_____ 15. _____ BM-21 range fan *(Plot range fans)*

_____ 16. _____ Arty Regt/23<sup>rd</sup> Inf Div *(Plot database entity)*

_____ 17. _____ BM-21 Range fan *(Plot range fans)*

_____ 18. _____ Arty Regt?23<sup>rd</sup> Inf Div *(Plot database entity)*

_____ 19. _____ BM-21 range fan *(plot range fans)*

_____ 20. _____ Are the items posted in RED? *(use draw pallet)*

Are the following items posted?
_____ 21. _____ U/I Battalion/Arty Regt/25<sup>th</sup> Inf Div *(Plot/create entity)*

_____ 22. _____Battalion Arty/ Inf Div *(Plot/create entity)*

_____ 23. _____Are the items posted in MAGENTA? *(Use draw pallet)*

_____ 24. _____Is the minefield location plotted correctly? *(Convert coordinates)*

_____ 25. _____Is the correct symbol used for the minefield? *(Use draw pallet)*

_____ 26. _____Is the color correct (GREEN)? *(Use draw pallet)*

_____ 27. _____Is the date time group posted?

_____ 28. _____Is the trench work/fortified line plotted correctly?

_____ 29. _____Is the correct symbol used for the trench work?

_____ 30. _____Is the date time group posted for the trench work?